

**The Human Side of Project Management -  
An Investigation of Critical Chain Concepts in the Argentinean  
Project Environment**

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**Abstract:**

The global marketplace is rapidly intensifying. Longer product sales lives, greater profit margins or simply survival, is dependent on management's ability to create and lead change. Project Management has become an important competency, combined with other business practices to adapt to the trend of changing conditions. Critical Chain is a relatively new project methodology, elaborated by Eliyahu Goldratt in order to complete projects faster, make more efficient use of resources and securing the project deliverables. The methodology is based on the assumption that traditional project techniques such as CPM and PERT, do not recognize critical human behavior. The methodology claims that many project failures are a direct result of how safety is built into the task delivery times, and then wasted by human behavior such as Student Syndrome, Parkinson Law and Multitasking. However, there has been little or no previous research regarding this topic in the Argentine marketplace. This study intended to investigate to what extent the human behavior concepts of critical chain project management are present, by performing in-depth interviews with Argentine project stakeholders.

It appears that the four human behavior concepts are present in Argentina and that the majority of Argentine companies are yet to apply project management techniques.

Thesis supervisor:

Dr. Paulo Roberto Motta, Professor, Getulio Vargas Foundation



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## **1.0 Introduction**

This dissertation will concern the discipline of Project Management and more specifically the method of Critical Chain.

The global market place is rapidly intensifying. Longer product sales lives, greater profit margins or simply survival, is dependent on the management's ability to create and lead change. Companies must exceed and be responsive to their customers' strict demands by bringing their products faster to the market and keeping up with rapidly-moving competitors. The project management discipline combined with other valued business practices will enable organizations to adapt to the trend of changing conditions.

Unfortunately, all projects experience uncertainty which will decrease the likelihood of meeting the projects objectives. In 1995, The Standish Group performed a study (The Chaos Report) investigating close to 10,000 million dollar IT projects across the US. According to their results did 52% of projects end up costing 189% of original estimate. Furthermore 31, 1% of the projects were cancelled, and only 16, 2% of the projects delivered on time and budget. Roberts (1995), state that the majority of all development projects fail to meet their time and costs targets with overruns of typically anywhere between 40 and 200%.

Currently, we find evidence that researchers are interested in the factors that might influence the effectiveness and success of a project (Jugrev & Muller 2005). Eliyahu Goldratt, author of Critical Chain (1997), contends that traditional project techniques do not recognize the human behavior aspect and proclaim the consideration of human behavior as one of the major constraints to meet the projects objectives. Steyn (2000) argues that human resource management is normally seen as a field of study quite separate from the tools and techniques of project time management.

The Critical Chain methodology is established on philosophy of the Theory of Constraints (1990). Goldratt and other advocates of the Critical Chain Project Management theory, claim that this technique reduce project duration, and therefore increases the likelihood of success and adapting to the changing conditions of global

market place. The methodology is based on four underpinning concepts related to human behavior; Activity Duration Estimation, Student Syndrome, Parkinson law and Multi-tasking.

The main objective of this study is therefore to investigate whether the cited human behavior related concepts are present in Argentina. Thus, indirectly explore the possibility of employing the Critical Chain methodology. It also aims to obtain a better understanding of the Argentine project environment by questioning applied approaches and challenges and in doing so, possibly offer suggestions of improvement to the marketplace.

The overall methodology of this study will be based on two different approaches which include data collection through desk literature review and semi- structured interviews.

The following chapter, review of relevant literature, will describe the project environment with general knowledge, present the most common techniques and finally elaborate on Critical Chain Project Management technique including previous theory, underpinning concepts and a brief illustration of the schedule.

The third chapter considers the research methodology adopted. It defines the research problem, and describes the research design, scope, sample, instruments, and data collection. It also contains a presentation of data analysis and interpretation.

The fourth chapter offers a presentation and analysis of the data. The chapter includes the questions presented during the interviews and general descriptions of the respondents' answers. The descriptions are also supported by direct quotes by the respondents.

The next chapter includes commentary and interpretation of the main outcomes. The importance of the findings is discussed and highlighted for further implications.

The final chapter contributes with summary and final conclusions. It will also indicate major implications and suggestions for further research.

## **2.0 Review of Relevant Literature**

### ***2.1 Introduction***

Since the day of light have human beings been organizing and managing their resources for desired outcomes or even survival. But it was only in the 1960s that companies and other organizational forms recognized the benefits of organized project management to deal with the rising complexity of the market place. Since then it has become common to see how companies, departments and different professions communicate and merge across borders to achieve their goals.

The Project Management Institute define Modern Project Management as the application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholders needs and expectations from a project (1996:165). Projects are defined by the same institute as a temporary endeavor undertaken to create a unique product or service. Temporary means that every project has a definite beginning and a definite end. Unique means that the product or service is different in some distinguishing way from all products or services. Furthermore, they are performed by people, constrained by limited resources and finally planned, executed and controlled (1996:167).

According to E. Verzuh (2005) are people and companies that innovate, that create and lead change, able to enjoy higher incomes and profit margins than those that compete based on economies of scale and efficiency. Project management together with other common business practices becomes the discipline to adapt to the changing conditions. But managing projects are far from easy. Frimpong & al. (2003) argue that even after half a century with modern project management do we still have many examples of projects exceeding their budgets, running late or failing to meet their objectives.

R. Max Wideman comments in his book *Wideman Comparative Glossary of Common Project Management Terms* (2006) that a project is successful when completed according to all requirements, and satisfies the project key success indicators.



In order to address the success and effectiveness has many variables and conditions been studied and modified. These factors include organizational structures, technical tools and models, leaders and their characteristics among other criteria.

Even though many factors have been updated does most of the techniques, tools and models basically remained untouched. Examples of lasting methods are the Bar charts developed by Henry Gantt (1861-1919), or the Program Evaluation and Review Technique (Pert) invented by the Booz Allen Hamilton, Inc in 1958. These leading techniques will be discussed and compared to the Critical Chain later in the chapter.

The process of defining and sequencing project activities, estimating resources and durations, or basically controlling and developing a schedule, is often called Project Time Management (PTM). The Project Management Institute defines the discipline; as the processes required ensuring timely completion of the project, and it includes the following major processes:

1. Activity Definition. Identify the specific activities that must be performed to produce the various project deliverables.
2. Activity Sequencing. Identify and documenting interactivity dependencies.
3. Activity Duration Estimating. Estimate the number of work periods which will be needed to complete individual activities.
4. Schedule Development. Analyze activity sequences, activity durations, and resource requirements to create the project schedule.
5. Schedule Control. Control changes in the project schedule.

(PMBOK 1996)

Herman Steyn (2002:2) emphasize why we should focus on the discipline PMT and scheduling. The author identifies the duration of a project as a major constraint of projects in general, and emphasizes on three reasons;

1. Positive cash flow obtained faster. Project costs often escalate as a result of extended duration. H. Steyn refers to studies by LP. Leach (1999) and tells us that when the schedule of a project with a fixed scope increases, so does usually the costs. He continues by stating that revenues are often reduced as a result of delays and offers a common assumption that reduced project duration would possibly result in increased project cost.

2. Contingency cost of delays. The second reason for shortening the duration is that the contingency cost could be high. The author directs us to the example offered in the book Critical Chain about the possibility of lost market shares in the case of delays.
3. Preventing changes to stakeholders needs. The third motivation is highly relevant for product development in industries where there are rapid changes in customer needs or technology, or even where products have extended life such as construction. H. Steyn believes that extended project duration possibly leads to scope changes, due to changes in stakeholders needs.

Another constraint recognized by the same author is resources. As companies strive to maximize their number of projects, while reducing the duration, bottlenecks appear. According to JR Turners estimations (1993) are 90% of all projects carried out in a multi-project context. The success of these multiple projects will depend on the allocation of shared and often overloaded resources.

The business goal of an enterprise is normally value creation, or in other words, to generate revenues. It is also their intention to reduce or if possible eliminate the constraints which might negatively influence their overall objective. It therefore becomes critical to adopt a project methodology which considers the major constraints of the projects. It is the writer's belief that the approach (CCPM), presented later in this chapter, offers significant contributions in regards to securing the project deliverables and the possible future of the company.

## ***2.2 Established techniques renowned for project planning and scheduling***

Before presenting the theory of Critical Chain, it would be valuable to revise the most widely used techniques, which also provides the basis for Goldratt's theory.

The first recognized evidence of the modern project management discipline emerged during the second world war; The Manhattan Project, which involved the planning, design and building of the world's first atomic bomb. The complexity of the enormous innovations such as weapons development could not be administered effectively by the existing management techniques. In order to deal with these new circumstances, the U.S. government constructed two well-known methodologies: Program Evaluation and Review Technique and Critical Path Method.

Mandyam Srinivasan, Darran Jones and Alex Miller (2001) contend that the Program Evaluation and Review Technique is the single most popular project management tool which also provides the means for identifying the Critical Path. The latter is the major determinant of the project completion date. The theory of Critical Chain expands on this notion of the Critical Path.

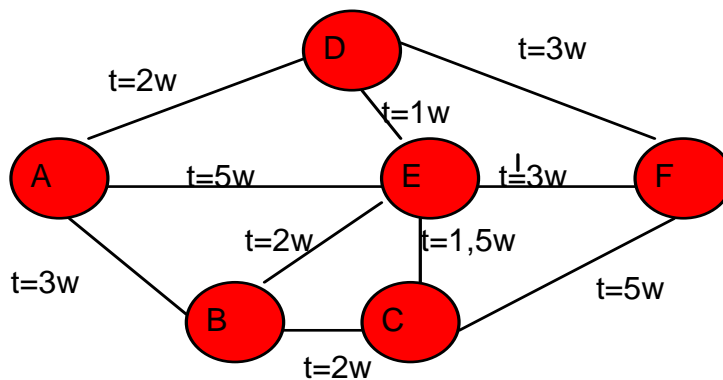
### **2.2.1 Program Evaluation and Review Technique**

Program Evaluation and Review Technique more commonly called PERT, was invented by Booz Allen Hamilton, Inc in 1958 to manage the design and construction of the world famous Polaris submarine. Due to the size and complexity of the missile project, it was critical to develop a model which could simplify the planning and organization of the different events.

The Project Management Institute defines as an event-oriented network analysis technique which is used to estimate project duration when there is a high degree of uncertainty with the individual activity duration estimates (1996:167). In other words, a method that analyzes and estimates the time of the different tasks and identifies the minimum time required to complete the whole project.

In order to facilitate the decision-making process, the technique offers a network representation commonly abbreviated as the PERT Chart. The chart illustrates the precedence or parallel relationships among the different project steps. As shown in the example below, will the chart number its events link them and then offer an estimate

of the different task durations.



**Figure 1 Simple example of a PERT chart**

John W. Chinneck (2003) contends that project management raise two important questions:

1. What is the shortest time for the completion of the project?
2. Which activities must be completed in order for the project to finish in the shortest possible time?

To find the answer to these questions, Program Evaluation and Review Technique apply the critical path concept. The Project Management Institute defines Critical Path as the series of activities which determines the earliest completion of the project (1996:162).

In the book, Practical Optimization: a Gentle Introduction written by John W. Chinneck (2003:2), we find a common approach of defining the Critical Path:

Step1: Make a forward pass through the diagram, calculating the earliest possible completion date (TE) for each event.

Step 2: Make a backward pass through the diagram and calculate the latest completion date (TL) for each event.

Step 3: Calculate the node (event) slack time (SA) for each event. This is the amount of flexible time which an event can be adjusted later than its TE without causing problems later on in the schedule.

Step 4: Calculate the slack time for each arc (activity).

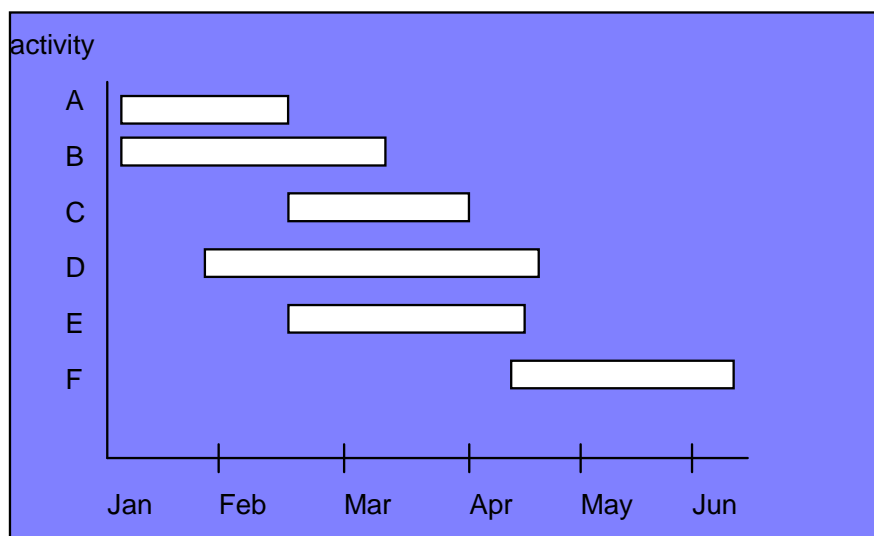
Step 5: The critical path connects the events where the node slack time and total slack

time is equal to zero.

The determination and task estimation of the critical path depend greatly on the accuracy of assessing the different tasks. John W. Chinneck (2003) offers the main approaches to assess duration: (1) Direct Estimation or (2) Three Estimate Approach. The first technique is estimation based on experience with similar projects, while the other are a weighted average of one optimistic, one pessimistic and finally one "average" based on past experience.

The weighted averages from the technique Three Estimate Approach does not consider bottlenecks or unavailability of resources. It basically assumes that the project has several teams to perform the activities simultaneously. If one of the tasks that the crew will carry out has sufficient slack time, it will be no issue on the overall project time. If not, the two activities must be prioritized and done in sequence.

One approach to organize the resources and also to create a visual scenario is to utilize a Gantt chart. The Project Management Institute defines the Gantt chart as a graphic display of schedule related information (1996:160). A typical bar chart will normally include activities or other project elements which are listed down the left side, dates across the top and activity durations as horizontal bars.



**Figure 2 Simple Illustration of a Bar-Chart**

One great advantage obtain from theses charts, is the visual clarity of resource.

Unfortunately, on complex projects they could be too big to print or display.

Today we see that many of the models used in corporations are similar to PERT. The Project Management Institute (1996:117) states that PERT do not account for path convergences and therefore underestimates time. It should also be mentioned that the model was designed for very large non-routine projects, where time is more relevant than cost.

### 2.2.2 Critical Path Method

The Critical Path Method (CPM) is a widely used and important tool for most project managers. It was invented by a joint venture between DuPont Corporation and Remington Rand Corporation for managing plant maintenance projects. Today we see that CPM is adopted and popular among many different industries and kinds of projects, such as construction, new product releases, computer software, and research and engineering.

The Project Management Institute defines CPM as a network analysis technique used to predict project duration by analyzing which sequence of activities (which path) has the least amount of scheduling flexibility (the least amount of float) (1996:162).

The main idea behind this is the existence of a "Critical Path", previously introduced and defined in the presentation of PERT (2.4.1). Levy et al. (1963) identifies the Critical Path as the longest path (in time) from start to finish. It indicates the minimum time necessary to complete the entire project.

To determine which activities are essential to the completion of the project, the article The ABCs of the Critical Path Method (Levy et al: 1963) suggests the following steps:

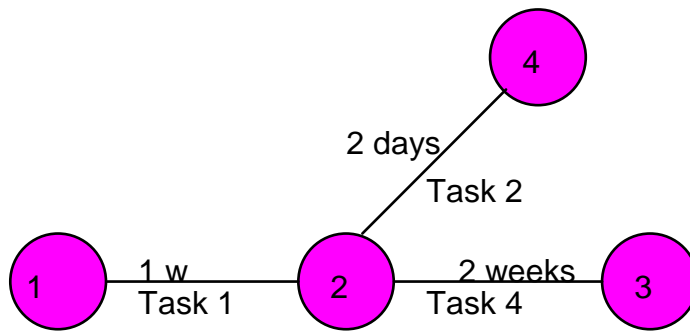
1. List all activities into a plan. This means to define the activities necessary complete the project, estimate the time duration of each activity and investigate the interdependencies among tasks (the prerequisite jobs).

Task	Poss. start	Length	Type	Dependent on
Task 1	Week 1	5 days	Sequential	
Task 2	Week 1	2 days	Sequential	1
Task 3	Week 3	2 weeks	Parallel	2
Task 4	Week 1	2 weeks	Sequential	1

Figure 3 Simple task list

2. Plot the different activities into a circle and arrow diagram. The circles will illustrate the different events (sequentially numbered) within the project. The arrows

between the circles show the job in order to complete the task.



**Figure 4 Simple circle and arrow diagram**

Levy et al (1963) states three requirements that are essential for the analysis of CPM:

1. The project consists of a well-defined collection of jobs (or activities), which, when completed, mark the end of the project.
2. The jobs may be started and stopped independently of each other, within a given sequence.
3. The jobs are ordered - that is, they must be performed in a technological sequence.

Finding the critical path is important to the project managers because it reveals those activities which are critical to the completion of the project and those (non-critical) which can be delayed if resource needs to be allocated. By stating the minimum time of the project, it allows managers to continuously monitor the schedule and to effectively organize the progress of the project without getting caught up in day to day problems.

In order to find the critical path, the approaches previously introduced in chapter 2.4.2 can be adopted. Hence, early dates are calculated on the bases of forward pass and late dates on the means of backward pass. The time estimations of each task are normally estimated based on experience (most likely) or the Three Estimate Approach which offers a distribution mean (see 2.4.1).

One unfavorable drawback for this technique is the time estimations. If the different task estimations are incorrect, the whole analysis could be faulty, causing major difficulties in the organization and delivery of the project.



### ***2.3 The theory of Critical Chain***

In 1984 Goldratt and Cox presented the Theory of Constraints (TOC), an alternative methodology how companies can improve their value creation. The main assumption behind the theory is that the revenue generation is limited by at least one bottleneck (a constraint) and that this bottleneck prevents the company to answer to market demands and to make more money. Hence, the company's success will be determined by their capacity to eliminate these constraints.

According to the TOC, in order to improve the performance one must first recognize the constraints of the system and then break it by concentrating on elevating it. This process goes through five focus steps:

1. Identify the system's constraints.
2. Decide how to exploit the system's constraints.
3. Subordinate everything else to the above decision.
4. Elevate the system's constraints.
5. If in the previous steps a constraint has been broken, go back to step 1. (Goldratt 1990)

In 1997 Goldratt applied the TOC framework to project management and introduced the novel Critical Chain. This modern project management technique is primarily developed for project scheduling and control, which is the theme of Goldratt's novel. The main objective of this new technique is to make more efficient use of company resources, complete projects faster and greater control.

A schedule should work as a predictive model for the project. In the project time management discipline, the activities such as activity definition, sequencing and estimation, together with schedule development and control, are critical elements which should be designed properly. In other words, the predicted model adopted is accountable for the projects success.

Steyn (2000), one of TOC advocates, argues that project human resource management is normally seen as a field of study quite separate from the tools and techniques of project management. In other words, current techniques and schedules ignore the

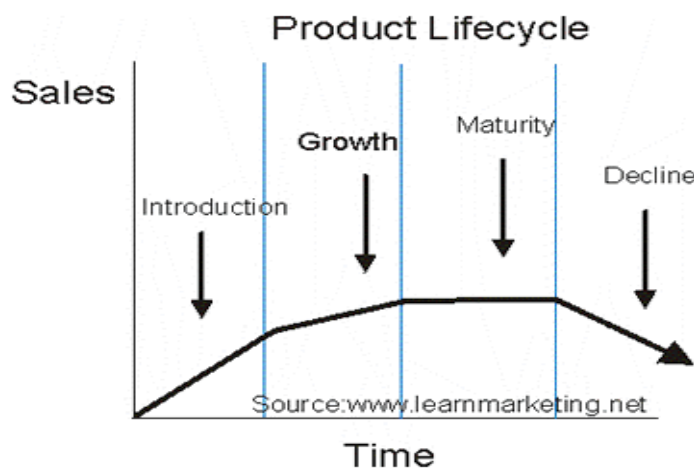
human behavior aspects.

Goldratt (1997) claims that in order to secure the deliverables of a project, it is necessary to develop a new schedule which considers the common human aspects. Leach (1999) has previously presented cases where CCPM was applied and project duration was reduced significantly.

In essence, Goldratt's schedule maintains the traditional sequential approach of schedule steps, but redefines how phases and tasks should be scheduled.

Before introducing the underpinned assumptions and schedule of Critical Chain, it is necessary to understand the importance of an adequate schedule in today's increasingly competitive market.

One important point emphasized by Goldratt is the life cycle of a product. This concept suggests that a product goes through four different stages of evolution: (1) Introduction, (2) Growth, (3) Maturity and (4) Decline.



**Figure 5 Product life circle**

Traditionally this means that an enterprise introduces a product to the market, the sales picks up during a depending time period until it finally stabilizes and in the end fades out. It is claimed by many authors that every product has a life cycle and many practitioners use it as a model, but in many cases the reality is different. Dhalla and Yuspeh (1976:102) describe the situation of many companies when they state;

***”The Product Life Cycle is a dependent variable which is determined by market actions; it is not an independent variable to which companies should adapt their marketing programs.”***

Today we see many examples of companies in fear of losing market share, launch new products which obsolesce the existing ones. In this case the PLC will look more like a triangle.

Many shares traded today are based on future expectations, and mentioned by Goldratt (1997), not on real assets neither on profit, the consequences of not delivering in time could seriously decrease share value and damage the shareholder, even end their business. The IBM study Innovation and Growth: A global perspective (Trevor Davis; 2000) confirms the financial importance of innovation and new product development. The study found that the companies which had over 80% of their revenues from new products and services doubled their market capitalization whereas those with 20% or less remained in same position or reduced.

As the product life cycles shorten, the importance of accelerating product development increases dramatically. By reducing time the given company could enjoy longer sales time, extract higher margins by being more responsive to its customers and start new projects.

For a company such as IBM and their clients in the electronics industry does small improvements or reductions in time make great difference. The IBM Global Services Publication (2002) describe one of their clients, which manages more than 500 projects running in small parallel engineering projects across 16 teams. In this environment small improvement can create great benefits.

Another critical factor to consider is the cost of delays to a company. The introduction date of a product can have strong financial implications. Most innovative companies face intense cost pressure and frequently we see that projects redefine desired outcomes in order to stay within the budget frame.

A common measurement tool utilized by professionals is Time to market (TTM). The

term usually indicates the time it takes for a product from when it is "invented" until launched in the market. Sadly, many managers improve their TTM by hop over steps, thereby often compromising quality or not recognizing them in the first place.

Delays, quality compromises or budget overruns are normally caused by so called external and internal uncertainty. Most projects experience the unexpected, and an industry such as insurance copes with it on a daily basis.

Eric Verzuh identifies two sorts of risks in his book; *The Fast Forward MBA in Project Management* (2005). The first category *known unknowns* identifies potential problems where we don't know exactly what will happen, but it could have a potential to damage the project. The second category *unknown unknowns* are those dilemmas which arrives unexpectedly so a project manager did not see coming. The main difference among these two is that the first category could be prepared for.

In order to avoid the penalties of delays, it is strategic to deal with uncertainty and factor it into the project estimations. As Force-Major inconveniently exists, Critical Chain Project Management consciously focuses on the *known unknowns* or the often ignored factor; human behavior.

## ***2.4 The underpinning concepts of critical chain***

As mentioned in the introduction this study will question whether the underpinning assumptions of critical chain are valid in the Argentinean project environment.

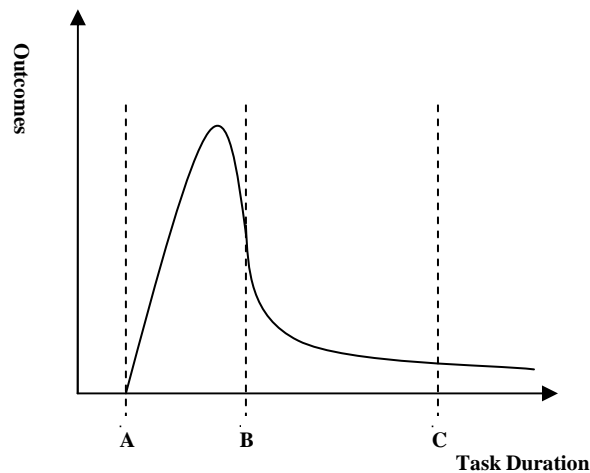
### **2.4.1 Activity Duration Estimation**

E. Verzuh defines estimating as forecasting the future, trying to predict time and money necessary to produce a result (2005:166). Predicting a project in an uncertain world is difficult even for an experienced project manager, especially when they are estimating without complete specification, uncertainties and depending on third parties. Understandably do the stakeholders want the deliverables on time and within budget, which pressures the team members to create reliable estimates.

One of the mayor assumptions underpinning the critical chain theory is how the stakeholders estimate the different time sequences. Goldratt contends that people involved with projects, overestimates or adds extra time, commonly referred to as safety. In most situations people consider their estimates as realistic, but according to Goldratt (1997:48-49) there are three mechanisms why people insert safety in almost every step of a project:

1. The estimates are based on a pessimistic experience, the end of the distribution curve as illustrated above.
2. The larger the number of management levels involved, the higher the total estimation, because each level adds it own safety factor.
3. The estimators also protect their estimations from global cuts.

Goldratt define safety as the difference between the median of the probability distribution and the actual estimate (1997:46). The figure below shows a common bell-shaped Gaussian which indicates the probability distribution of possible outcome of a task. The probability distribution has a quite peculiar shape. The right tail is quite long due to Murphy's Law ("everything that can go wrong, will"), and the left is short since no tasks finishes in zero or negative time. The three letters A, B, C indicates different potential task estimations. A illustrates great success, B an average estimation with 50/50 likelihood, and finally C which indicates an estimation that could count for a mayor uncertainty.



**Figure 6: Goldratt's uncertainty estimation (Possible Task Distribution)**

Goldratt label C as a "95% time" because in 95% of the cases, the task will be completed in less time than the estimate. In order to achieve the due-date, many people quite understandably offer C as their estimate. Ironically, when companies create incentive systems for deadlines, they actually motivate these kinds of estimation practices.

Goldratt offers a quite simple and comprehensible example of this assumption in *Critical Chain* (1997). The example considers how much time Brian will use on his ride home from the university. It ranges from 10 minutes at night until an infinite amount of time due to traffic, flat tire etc. In this case A would be 10 minutes, and C would be which ever convenient point on the endless tail.

Adding safety is not wrong, it's natural. The question raised is; where is it appropriate to insert the extra time. Most researchers and practitioners agree upon adding a safety level to guarantee the different activities. It should be emphasized that the time in discussion is not transparent. It is not illustrated in any chart or path. It therefore becomes complex for a project manager to organize this time to the best of its purpose. In this sense, the activity holders become the owner of the safety. Hence, they can administer it according their personal preferences and sadly in an environment that favors the human behavior concepts listed below.

## 2.4.2 Student Syndrome

One of the mayor problems connected to adding safety to each and every step, is the concept student syndrome. Named after an example in Critical Chain (1997), where Goldratt elaborates what happened to a group of students and their professor when they were given a class assignment. Initially the students complain about the workload and state that the task will require more time than the established one-week due date. The professor accepts and postpones the date. Later, when the due date arrived very few students manage to deliver. Revising, the students pick up one common thread, which is familiar to most of us. First they fought for safety, and when they had it, it was no hurry. None of the students went home and immediately started the assignment. Instead later on in the process, when they came across problems, they started realizing that they had already wasted the safety. Hence, they were not able to deliver in-time.

		1 week							2. week						
Task	Duration	M	T	W	T	F	S	S	M	T	W	T	F	S	S
Assignment	14 days														

**Figure 6 Illustration of Student Syndrome**

Illustrated above, this rational concept is not new to project management. When they then come across a problem, the deadline is missed. It should now be mentioned that if the task holder would have started on assignment date, he would have managed to meet deadline, even if there was a problem.

## 2.4.3 Parkinson Law

The law of Parkinson written by C. Northcote Parkinson, first appeared in *The Economist* in 1955. The scientific formula is widely accepted and states work expands so as to fill the time available for its completion (1955:1).

One example offered by Parkinson himself (1955) is the one of the older lady, which could possibly use a whole day to send a postcard. A task most of us could easily complete in few minutes.

In a project environment, it's not common that a task finishes early. The workers fill their time with other tasks, striving for unnecessary perfection or simply fitting their effort level to the task schedule to keep busy. This because the project environment does stress the importance of not delivering late and on the other side does not promote early finishes. The novel CC (1997) explains that when workers finish their task early they invite the management to cut the times, which could make them unpopular among co-workers.

#### **2.4.4 Multitasking**

In Critical Chain (1997), Goldratt contends that multitasking is probably the biggest killer of lead time and defines it as the dependencies among the different steps.

In this thesis multitasking refers to when a resource such as a machine or an employee which has more than one ongoing activity or attends more than one project. In this situation, the resource has to be juggled in-between tasks and projects in order to complete the processing and moved to the next activity.

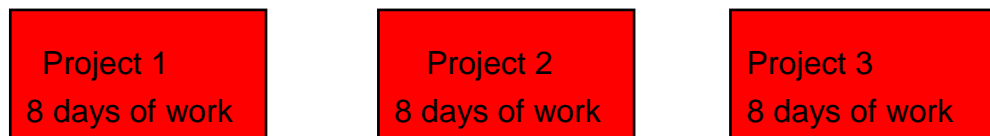
In the literature these resources are commonly referred to as bottlenecks. Goldratt defines it as resource with capacity that is not sufficient to produce the quantities that the market demands (1997:153). This means that the resource limit's the company to achieve higher performance.

Project environment is considered hectic due to time pressure and because an employee normally will respond to more than one project and therefore more than one manager. Project managers are responsible and evaluated for the delivery of projects, and therefore they expect return and progress from its resources. So in order to balance the pressure from different demanding managers, the employee will strive to satisfy all and juggle between tasks.

In order to illustrate how multitasking wastes valuable time there will be adopted a similar example of the one given by Goldratt (1997). In this worst case scenario, a resource who is considered a bottleneck is attending three ongoing projects. To keep

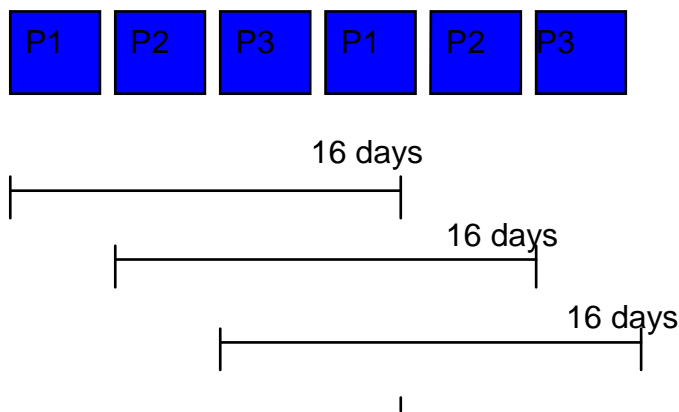


the example simple it has been chosen that each task will take eight working days each.



**Figure 7 Illustration Multitasking -1**

As the resource is striving to satisfy the different managers, he works 4 days at each project equally. In reality the projects are queuing, standing in line and being unavailable for the next step in the process to start.



**Figure 8 Illustration Multitasking -2**

As the diagrams above illustrate, these types of actions can double the lead time for the projects.

This study presumes that the unavailability due to queuing, accounts for a significant portion of wasted time. It is therefore suggested critical to emphasize communication and prioritization among individual task in order to achieve higher fluency.

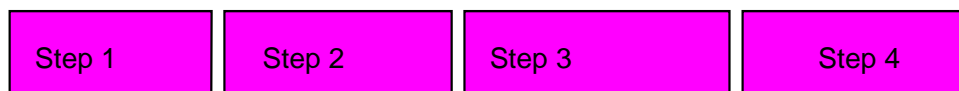
## ***2.5 Critical Chain methodology***

The main objective of this section is to introduce the schedule of Critical Chain (1997). A short implementation guide will be included to enhance the understanding of the reader. Since this dissertation does not validate the theory itself, there will be no comparison of previously presented techniques or justification of schedule itself.

As mentioned previously, Goldratt believes that a factor for project failure is due to how safety is estimated into the task delivery times, and then wasted by common human behavior such as student syndrome, Parkinson law and multitasking. By expanding on the important notions of PERT (2.2.1) and Critical Path (2.2.2), the critical chain strives to unify the human side and the algorithmic methodology side of modern project management.

Steyn (2000) emphasize difference between the critical path and the critical chain and contends that the Critical Path traditionally only determined by precedence relationships and resource limitations are taken care of after the critical path has been defined. While the critical chain on the other hand take resource limitations into account, and composes sections which are dependent on precedence relationships and other dependent on resource availability.

Critical Chain requires a well elaborated critical path network. It will be visually beneficial to illustrate the presentation with simple examples taken from Goldratt's novel.



**Figure 9 Critical Path Illustration**

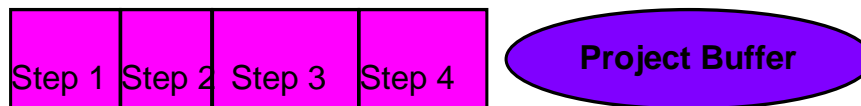
The figure above illustrates a common chart of critical path where safety is hidden within the task estimation. As uncertainty is part of the project environment, Goldratt (1997) assures that provision for contingencies is not wrong, but emphasizes that it should be pooled as a project resource and not as a hidden task resource.

The first step of converting a critical path into a critical chain is to remove the hidden

task resource. In order to remove the safety, Goldratt (1997) suggests a single estimate procedure. The objective of this approach is to obtain an estimation which has 50 % chance of being met. To derive this estimate, the stakeholders should assume the following:

1. All material and information needed for the task is available.
2. The team members are able to focus on the tasks (no interruptions).
3. No surprises that trigger additional work.

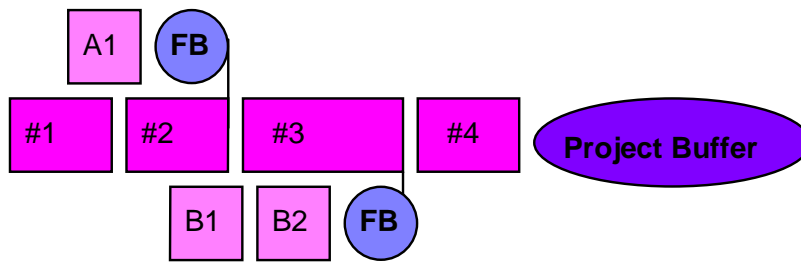
The next step in the transformation process would be to reorganize the extra time to the end of the project where it can function as a buffer for the overall project.



**Figure 10 Critical Path + Project Buffer**

Srinivasan, Jones and Miller (2001) tells us a that a project buffer is based on the variance of the total activity time. This variance is measured by summing up the variance for each activity. These authors also state that if the buffers are properly sized, the activities along the critical chain that requires inputs from non-critical chains have a better chance of being able to start as soon as its predecessor task on the critical chain is complete.

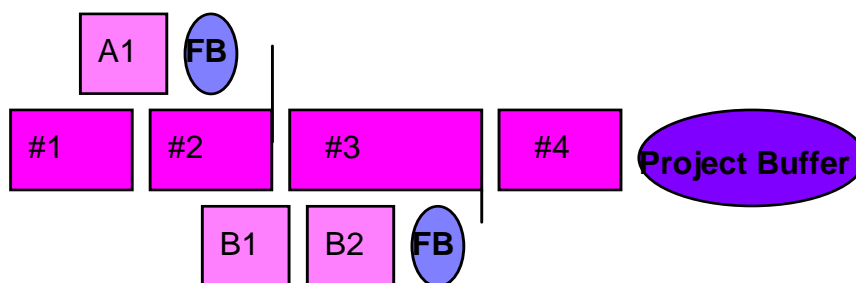
In the case of hidden safety in non-critical activities, the variance will be consolidated into a feeding buffer. The feeding buffers will be placed between the non-critical and the critical activity to protect the critical path against negative variations. One important observation that should be noted is that if a problem occurs on a non-critical activity, and causes a delay greater than the feeding buffer, the completion date of the project is still protected by the project buffer.



**Figure 11 Critical Path + Feedingbuffers**

In some cases where resources are scheduled simultaneously, it is essential to de-conflict resources. A traditional schedule will normally allow simultaneous task, but in the project environment it is often recognized as unrealistic. In this case Goldratt (1997) recommends adding another feeding buffer to protect the critical path, even though the schedule will increase its time.

The following step is based on The Random Aggregation Theory. In accordance to this theory will the total variance of the project be less than the sum of the variance of each activity. Recognizing unnecessary protection, Goldratt (1997) suggests cutting the project buffer estimation in half, leaving buffer one half of the length of the critical chain. The same notion should be adopted for the feeding buffers.



**Figure 12 Illustration of Buffers cut in half**

The next step in the conversion process is to prepare and alert the different team members of the upcoming task. In the novel of critical chain (1997) this report and alert system is referred to as resource buffer. The idea is essentially that a schedule keeper (most cases the project manager) will receive daily updates from the team members currently working on an activity and then use this information to update the successor on how many days remain until they will be working on a task on the critical chain. The main objective of this system is to let the stakeholders plan their schedule and be able to communicate to other project managers (multi-project environment) their status.

The final important implication of the critical chain schedule embrace the management form itself. In a critical chain schedule the managers will be able to measure the buffers. By analyzing the consummation of the project and feeding buffers the managers will potentially be able to discover problems earlier and act proactively. The advocates of critical chain often refers to this method as buffer management.

In order to address some of the unfavorable human behavior aspects, it has been emphasized that a total paradigm shift would be necessary. Some of these changes are difficult for a team and Goldratt stress the importance of the departures from traditional methods.

The main challenge in a conversion of schedule would be to remove safety from tasks level to project level. In order to accomplish this task a project manager would have to create a serious change in organizational behavior and culture. First would be important to emphasize that safety is not taken away, but reorganized. Secondly, fear must be exposed and finally management support is essential.

Many traditional techniques utilize the approach as soon as possible in order to schedule the tasks. The critical chain recommends starting all tasks as late as possible. For companies the demand of completion dates and results are normal. This means that when project tasks are defined with durations and dependencies, they will be entered backwards from defined end date.

Many of the advocates of Critical Chain pinpoint teamwork and the relay race analogy. In a typical relay race will the contenders normally run as fast as possible, and then pass the baton to the next who is ready to give their best in the quickest possible way. This analogy enhances the importance of teamwork, preparation and task concentration. The resource buffers will potentially organize this, but it may require a change in the individual and organizational behavior.

### **2.5.1 Critique of the Critical Chain Methodology**

The author of this dissertation recognizes that certain aspects of the theory of Critical Chain Project Management requires further research, but the theory is at received great amount acknowledgment both from the academic and corporate environment.

This dissertation does therefore not question the approach general validity but focuses whether it is applicable to the Argentinean marketplace. For the knowledge of the reader, some stated resistance should be mentioned but will not be discussed.

First of all, Duncan (1993) questions whether the approach is something new. The author states that the Critical Chain approach make use of system dynamics developed by Forrester in the 1950s and from statistical process control which dates back to the second world war. However, he recognizes some of the ideas, but questions whether these are actually new and if they are valuable if a stakeholder is applying the concepts from PMBOK.

Elton and Roe (1998) emphasize that the approach does not explain how companies should manage a multi-project environment, so the managers have to turn to other advice when the theory falls short. The authors admit that the methodology offers discipline to project management.

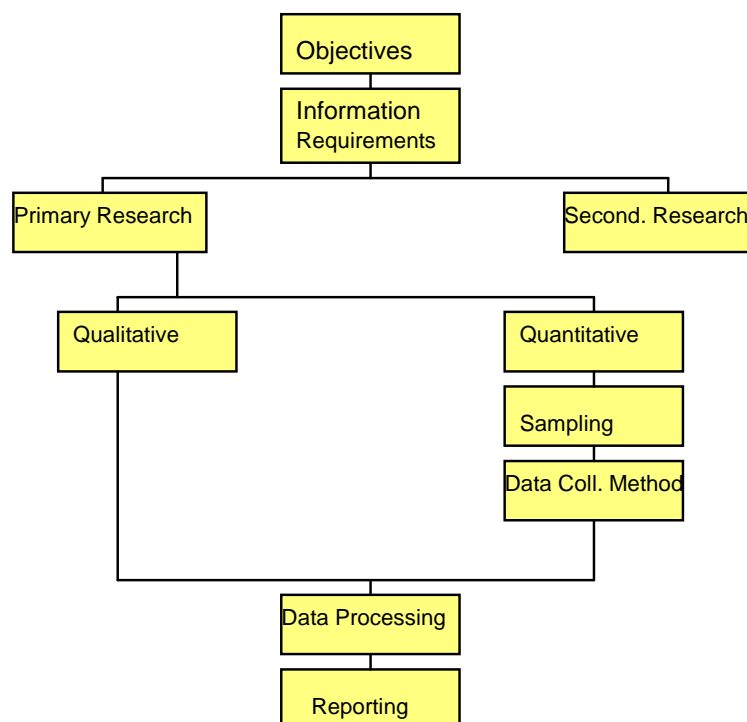
## 3.0 Design and Methodology of the research

### 3.1 Introduction

The main objective of this chapter is to clarify the progression of the research.

The discipline of investigation is normally divided into two main methods; qualitative and quantitative. As the two terms might indicate, does the first to some degree imply quality, whilst the other quantity. The general division is whether the objective is to obtain an understanding (qualitative) or to measure certain aspects (quantitative).

Hague and Jackson define Research Method as how the required information will be collected (1999:48). The same authors suggest a framework for developing research design with the choices driven by the objectives and information requirements.



**Figure 14 Research Framework offered by Hague and Jackson (1999:49)**

As the framework illustrates, regardless of investigation method chosen to gather data or requirements, is the primary task to identify the objectives. The main reason for this is to determine; which method best fit's the needs of the study, to gather more useful data, and finally to create a more focused agenda.

### **3.2 Problem Definition**

*A problem well defined is half-solved*

- John Dewey

Due to knowledge of problematic delivery issues in the project environment, the writer of this dissertation wanted to find an alternative methodology that emphasize the importance human behavior.

In order to ensure the quality of the research, established theory and research has been reviewed. Furthermore, a clear and distinct research problem will function as a guideline through the research process. This way the research problem functioned as an effective tool in order to maintain direction.

Malhotra defines Research Problem as a problem that entails determining what information is needed and how it can be obtained (1999:46).

Hence, the key research question will be;

***” To what extent does the human behavior related concepts such Activity Duration Estimation, Student Syndrome, Parkinson Law and Multitasking exist in the Argentinean project environment”***

The researcher also aims to obtain a greater understanding of the Argentinean project environment by:

1. Identify common challenges in the Argentinean project environment.
2. Identify commonly applied Project Management Techniques.
3. Identify which approaches are applied in order to estimate activity duration.
4. Determine whether Student Syndrome and Parkinson Law are existent in the Argentinean Project Environment
5. Determining whether Multitasking is common in the Argentinean project environment.



### ***3.3 Research Design***

In order to collect and analyze data a blueprint can be advantageous. Churchill and Iacobucci define research design as a framework or plan for a study, used as a guide to collect and analyze data (2005:74). It is the blueprint that is followed to complete a study.

Churchill and Iacobucci also tell us that research design frameworks can be divided into three basic types: exploratory, descriptive and casual (2005:74). The authors explain that these three frameworks serve different purposes. The exploratory relates to the discovery of insights and ideas, while descriptive research study normally involve with determining the frequency with which something occurs or the relationship between to variables. The casual framework concerns determining cause and effect by investigating relationship.

Churchill and Iacobucci define exploratory research design normally utilized in order to:

- Formulate problems for more precise investigation.
- Develop hypotheses.
- Establish priorities for further research.
- Gather information about practical problems of carrying out relevant research.
- Increase familiarity with the problem.
- Clarify concepts (2005:77).

Since Critical Chain Project Management is relatively new and there is no previous research on the methodology in Latin America, the exploratory research framework is adopted.

### ***3.4 Scope***

In order to find explanations and acquire knowledge, researchers can adopt three different approaches. The first alternative is through observation. This technique is normally considered when it's preferable to watch people instead of talking to them. The second alternative considers group discussion, commonly referred to as focus groups. Focus groups are discussions among 6-12 people where brainstorming and other techniques creates sharing of opinion among the respondents. The third possible technique is to perform in-depth interviews. In this context a respondent answers "without restraints" the questions of the interviewer.

Since it is very difficult to recruit key business people into focus groups, and to avoid "contamination" of the answers, it will natural to exclude group discussion as a qualitative approach. In order to answer the research question of exploratory nature, it will also be necessary to let the stakeholders speak openly about the subject. The alternative of observation is therefore excluded as well.

Thus, in-depth interviews were adopted for the study to provide more knowledge.

In general, interviewing can be carried out through three forms: face to face, telephone or self-completion. Even though phone and postal surveys can be useful in certain contexts, the researcher believes that face to face interactions very important based on the benefits mentioned below. Even considering that it might be more difficult to organize, and normally can require more resources.

Hague and Jackson (1999) tell us that we can obtain three main benefits from this technique:

1. Better explanations. During personal interviews the respondents have more time to evaluate their answers and the researcher can gain deeper understanding of the validity of the response.
2. Depth. It is less complicated to maintain the interest of respondents for a longer period in personal interviews. Face-to-face with respondents gives the interviewer more control and refusals to answer are less likely. Concerns about confidentiality can readily be satisfied.
3. Greater accuracy. During the interview session respondents can look up

information. In a business environment, it can be referred to files or phone calls can be made to colleagues.

Considering the benefits mentioned above as well as cultural aspects in the environment, the writer of the dissertation found it appropriate to arrange personal meetings with the respondents.

### ***3.5 Research Sample***

The main objective with the interviews was to investigate whether the suggested attitudes and human aspects are current in companies which perform project management in the Argentinean market.

The main selection criteria for companies participating in the survey:

- The companies should apply modern Project Modern activities (confirm when approach).
- Medium to large Argentinean and multinational companies.
- Represent different business sectors.

The respondents are supposed to be people with superior (deep and overall) knowledge and experience in the project environment and but they should also have work assignment roles which are relevant to the dissertation, such as project managers or other stakeholders. This statement will function as a requirement before meeting.

The Norwegian Embassy and the University of San Andres assisted with recognition of thesis and recommend contacts and companies.

### ***3.6 Instruments***

To collect data from the different respondents an interview schedule was adopted. The interview schedule was formed and is attached as an appendix 1.

The complete interview schedule was a result of literature research but also formed on the bases of personal experience and conversations with Professor Delane Botelho and Professor Paulo Roberto Motta from Getulio Vargas Foundation and Dr. Roy Stratton from the Goldratt institute.

The interview schedule can be considered to be of a slightly static form or commonly classified as semi-structured. As the interviews were open and semi structured, the respondent was only driven by researcher if he/she did not talk. The prepared plan structure (schedule) was mainly used as a guide and brought up in case the interviewee did not answer the respective aspects.

In order to avoid misunderstandings some of the statements were repeated and concluded. Furthermore, in case the respondent did not understand the question or if there was a need to stimulate discussion, the original question was followed by complementary or in certain cases hypothetical questions.

The respondents also received a presentation in the form of a summary before the meetings. The main argument for this was to establish a scope of interview and “saving time” during the session. The interviews were also mainly done in the environments of the respondent.

The schedule itself was divided into three main sections. The first section considers the Argentinean project environment in general and the company where respondents were employed. The main objective was to create a comfortable atmosphere and generate more knowledge about the environment. The second section dealt with common schedule and planning techniques, and introduced the concept of time management techniques. The third and final section dealt with the human behavior aspects of project management and the underpinned assumptions of the theory of the Critical Chain methodology.

### ***3.7 Data collection***

The purpose of choosing depth-interviews with respondents was to obtain ideas, experience and knowledge. In order to acquire this information the interviews were performed with the respondents' one at time. Prior to the interview the respondents were informed of the scope of the interview, what would be discussed and they also received by mail the interview schedule.

Before starting the interviews the respondents received information about anonymity, and about their right to set restrictions on what was going to be published. Furthermore, the researcher of this thesis also described the character of the interview, that there would be open-ended questions, without restraints, to create discussion.

The respondents were asked about their own experience in the project environment, both prior, in general and in their own company. The respondents where also asked questions about techniques applied and human behavior issues related to this study.

The investigated methodology was not mentioned unless the respondents had questions after the formal part of the interview. The reason for this was to avoid contamination (guiding) of the answers of the respondents.

### ***3.8 Analyze and interpret data***

When open-ended interviews are performed, the researcher receives full responses with often subtle and complex data. Even though a researcher can choose to code responses, Hague and Jackson (1999) tell us that it is seldom appropriate since the researcher can risk losing details and it's unusual to list and compare full responses.

Since all interviews are tape-recorded one option was to transcribe them into typed-up text and carry out analysis with the material. Since the researcher took notes during the interview and made reports of all tapes, it was considered un-necessary with the additional work.

## **4.0 Results and Discussion**

This main objective of this research was to investigate the possibility of employing the Critical Chain Project Management approach in the Argentinean market place.

In order to investigate the possibility of employing Goldratt`s approach it was necessary to explore the following concepts: (1) Activity duration estimation, (2) Student Syndrome, (3) Parkinson Law and finally (4) Multitasking. It was also desired to obtain a better understanding of Argentinean project practices by asking respondents about common challenges, practices and perceptions of the project environment.

In order to present all relevant information the chapter is divided in two main parts; (1) Presentation of results and (2) Analysis and discussion.



## ***4.1 Presentation of results***

The presentation below is a summary of the different respondents' personal opinions and experience. The results are presented according to three main sections in the interview schedule (see 3.6 instruments).

According to Paul Hague and Peter Jackson (1999) is it appropriate to present general descriptions of answers and verbal quotations in order to enhance the readers experience by exemplifying and highlighting important points.

### **4.1.1 Argentinean Project Environment**

**Can you give an overview of what you think project management in general does for your company? What benefits does it involve?**

All seven respondents recognized several benefits linked to utilizing project management techniques.

The most common benefits mentioned were:

- Improved administration, control and coordination of resources and deliverables.
- Facilitated the decision-making process.
- Offered direction.
- Allowed managers and employees to stay focused throughout the process.
- Enhanced information throughout the process.
- Assisted the project manager to evaluate the evolution of the job and the project as a whole (learning process).
- Facilitates teamwork.

In addition to these commonly recognized benefits, Marcelo Pedriel (respondent no.1) also pointed out that the use of project management techniques create professionalism in the work environment and improves the communication with suppliers and clients.

**What are the most common challenges (problems) in the industry and your company?**

Below, a summary of the respondents' answers is presented. The three challenges (summoned below) are all pointed out by the majority of respondents. The first mentioned challenge is commonly known to all project managers, the following two

are more specifically related to Argentina's business context and culture.

1. To secure the project deliverables. These deliverables was defined as; (1) budget, (2) time and (3) quality. Respondent number 6, Gaston Carrion, also stated the challenge of *"making these elements work together"*.

2. To manage the consequences of changes in the political and economical frame of the country. Respondent number 1, Marcelo Pedriel emphasized that Argentinean managers constantly need to foresee, tackle and solve complex challenges due to external forces.

3. To manage projects in a "Culture of poor planning and organization". This challenge was named by some respondents as "learning". More specifically mentioned was; poor problem definitions and avoidance of diagnostic planning processes. Respondent number 2, Nicolas Caporale, also commented that this type of behavior could result in other problems such as; lower efficiency, higher operational costs and accidents.

**Have your company ever failed to meet the objectives of a project and how common do you think is in Argentina?**

Six out of seven respondents (one respondent refused to answer) confirmed directly or indirectly that they previously had failed to meet the desired objectives. Respondents' number 6 and 7, who work as consultants, also assumed that respectively 70 % and 60 % of all Argentinean projects failed according to this success definition.

**What are the advantages for your company to deliver projects on due-dates or sooner?**

Only two respondents found it sufficiently advantageous or disadvantageous to finish a project before due date in order to answer the question. Respondent number 4, Maximiliano Westen assumes that if the department could deliver the proposals before the official due date the company could obtain more contracts. Respondent number 7, Fernando Lopez Santos, was afraid that Chilmington might loose money by charging less hours of their clients.

#### **4.1.2 Common Schedules and techniques**

**According to your experience, which are the most common techniques adopted in Argentina?**

According to the respondents are the following techniques the most commonly utilized: Program Evaluation and Review Technique (PERT), Critical Path Method, Gantt Charts, Microsoft Project (management software program), Status reports, communication plans and other project tools developed by companies.

Five of the respondents believed that the majority of Argentinean does not apply any of these techniques.

Two of the respondents did not have sufficient knowledge to talk about commonly utilized project management techniques.

**Which technique does your company apply, and why is that?**

The respondents' number 3 and 6 inform that they consider their project tools as a competitive advantage, and therefore considered as classified information.

Three out of seven respondents admitted that the department/company where they currently work do not utilize any project management techniques.

Respondents' number 2 and 3 answered that the company is currently applying the Gantt chart and are also getting familiar with Microsoft Project.

**Do you have any problems or do you see any problems with the usability of these techniques?**

Three of the respondents considered the techniques as "resource-consuming".

Respondent number 3, Dario Gusovsky, complemented this notion by stating:

*"It is a challenging job to be a project manager; to plan, administer, monitor and present".*

The latter respondent also emphasized that some of these tools could give wrong conclusions, especially if the person in charge is not properly trained.

One respondent considers the mentioned techniques as not applicable for commercial departments since there are not necessarily any define stages.

Another respondent proposed that in order to avoid difficulties, the companies should consider more than one technique (suggesting that they are complementary).

#### **4.1.3 Human Behavior Aspects**

##### **To what extent would you consider that these techniques consider human behavior?**

Two respondents considered and another three respondents suspected that the commonly utilized approaches do not take into account human behavior aspects.

Two respondents had not previously given this aspect any previous consideration.

Respondent 3, Dario Gusovsky, stated the following: *“They are not considering the behavior aspects that we experience trouble with. As a matter of fact, most of the hours we (regional managers) spend during our monthly report sessions, we discuss the variables that are not present in our numbers“.*

Respondent number 6 has developed a reward- and sanction system in order to control undesired behavior aspects.

Respondent number 1 said that it is the management that should take into account the behavior aspects, not the techniques.

#### **Activity Duration Estimation:**

##### **In the case of task duration estimation, which technique is normally applied?**

The respondents applies at least one the following techniques:

- Company database (estimation tool with standard measures).
- Managers experience.
- Each team members define or discusses (negotiates) with manager.

##### **To what extent to you think that project stakeholders overestimates or adds extra time due to previous experience?**

All of the respondents believed that it is very common to add extra time into the schedule.

Respondent number 7 emphasized that the management group of Chilton is aware of overestimation procedures and as a response they are solely responsible for the task estimation. The respondent also stated the following: *“Argentineans know too much about Murphy’s Law to not overestimate”*.

Respondent number 6, Gaston Carrion, believes that this type of behavior is more common when the management has no knowledge of the amount of time it takes to complete the task. The respondent has also witnessed the contrary of this situation, where eager employees underestimate *“because they want to seem effective and productive”*.

**Do you think team members protect their schedule from “global” cuts?**

Respondent number 3, Darío Gusovsky, believes that the behavior of the employees depends on the adopted procedures and the culture of the company. If the management has a tendency to cut globally on the schedules, then the team members will add extra safety.

**Do you think that the different levels of managers add extra safety?**

Five of the respondents (all managers) supposed that in many situations managers add extra time to the project schedule. Respondents’ number 2 and 6 explained this behavior respectively by “Pride of success” and “fear of failure”.

**In your opinion, what happens to this respective time if no uncertainties occur?**

Only four out of seven respondents commented on the question. These four respondents assumed that this time was lost, wasted or spent on other projects.

Respondent number 7 also admitted to consciously utilize this time otherwise the company had to charge less money from their clients.

**Student Syndrome:**

**To what extent do you think it’s normal to always start the tasks at the**

**established dates? In the case of no, what is the reason?**

The respondents unanimously confirm the concept of “The Student Syndrome” and consider it to be a natural human act.

They also list the following motives:

- When employees dislike tasks.
- When employees are overworked.
- Humans tend to postpone problems and decisions.
- Multitasking. The employees have to choose between “urgent and important matters (statement from respondent number 5)
- Lack of planning.
- Fear of tasks or change.

Respondent number 2 stated that this sort of behavior worsens if not monitored and controlled. Respondent number 6 suggest informing employees about upcoming steps during the project meetings in order to improve this type of behavior.

**Parkinson Law****To what degree do you think people consume the time they have available?**

Only one of the respondents had previously heard about the concept of Parkinson Law. The six other respondents needed an example in order to completely understand the concept. The example of the elderly lady in C. N. Parkinson’s own article from 1955 was recited in order to create a proper understanding, and to avoid any misguidance from the interviewer.

Five out of seven respondents recognize the concept of Parkinson Law as natural human behavior. The final two respondents found the concept both rational and interesting.

Two of the respondents believe that the concept is related to motivation. Respondent number 2 emphasized the importance of promoting early finishes and giving recognition to employees obtains this objective.

**Multitasking:**

**In your opinion, is it normal to work on more than one project or in the case of**

**one project has more than one activity simultaneously?**

All of the respondents said that multitasking is very common and also part of how the companies they work for handle activities.

***Would you consider this a possible bottleneck?***

All of the respondents assume that multitasking can be a potential bottleneck.

According to their experience, it depends on the organization of project/company and managers ability to manage the team.

Two of the respondents recognized it to be an actual and serious problem in their department.

Three of the respondents also emphasized that Multitasking could benefits when done correctly: Respondent number 3 considers it to a healthy part of the global business environment which makes people feel effective and good about themselves.

Respondent number 4 said that it makes his work more interesting.

Respondent number 5 finds it stimulating when he is not under too much pressure.

Respondent number 6 recommended the following strategies to avoid the problem and to obtain the benefits: (1) delegate task correctly, (2) empower the team members, (3) communicate properly, and (4) balance the resources. Other respondents mentioned the importance of clear communication and prioritizing.

## ***4.2 Discussion of results***

This section of the dissertation includes an analysis and discussion of the results presented above. The questions raised in chapter 3.2 will offer direction for the discussion and the three main sections of the interview schedule will function as headings in order to relate the findings and thereby achieve a greater understanding of results.

### **4.2.1 Common challenges**

The findings of this study suggest that the main challenges of Argentinean project managers is to; (1) To secure the project deliverables, (2) To manage the consequences of changes in the political and economical frame and (3) To manage projects in a “Culture of poor planning and organization”.

The primary challenge according to the respondents is; to secure the deliverables. This discovery is not a new concern. As mentioned in chapter 2 does previous research (Frimpong & al 2003) show that after half a decade of modern project management do we still have examples of projects exceeding their budgets, running late or failing to meet the desired objectives.

R. Max Wideman (2002) highlights the importance of securing the deliverables by regarding achieving all objectives to the full satisfaction of the users as a judging criterion to whether a project was successful or not.

The second challenge mentioned by the respondents was the changes in the Argentinean political and economical frame. As most know, Argentina is still recovering from the 2001-2002 economical and political crises, and it is considered by many, as country where it is complex to do business. Political changes and economic reforms have too often influenced business aspects such as intellectual property, taxation, environmental programs, and currency management among others. Uncertain events and their impact on projects can neither be classified as a new concern in the international business environment. The identification process of uncertain events is commonly referred to as Risk Management.



The third and final major challenge emphasized by the majority of the respondents is the Argentinean culture of poor planning and organization. More specifically highlighted was a widespread lack of diagnostic processes, and poor problem definitions. Lack of planning is often referred to as a recipe for failure and the amount of articles discussing the topic also suggest that the phenomenon is not country-specific, rather a common human behavior trait.

The results demonstrate an urgent need for tools that can simplify an Argentine manager' job, and turn uncertain events into opportunities and desired outcomes for their companies.

The last 50 years has numerous techniques and tools been developed to deal with challenges such as the ones mentioned above. Modern Project Management has become a recognized organizational competence, which enables the company to navigate in complex and unstable environment, securing the deliverables and therefore, the project success.

Many practitioners' has emphasized that both change and uncertainty are direct causes of project failure. Erik Verzuh (2005:5) stresses the importance of tackling these causes and gives us an important insight:

*[W]e may resist or resent change, particularly when it is forced upon us in the form of new regulations or new competition. But change cannot be denied and the pace is faster than ever.*

Accepting change as an opportunity rather than resisting it, can empower the companies to adapt, assimilate and emphasize on innovation. But innovation and recognition of opportunities requires a prepared organization. The saying "As you fail to plan, you are planning to fail" affirm the importance of planning on project success.

Project Management includes developing a project plan. Eric Verzuh (2005:132) emphasize that a detailed plan should include the following steps:

1. Create the project definition.
2. Develop a risk management strategy.

3. Build a work breakdown structure.
4. Identify task relationships.
5. Estimate work packages.
6. Calculate initial schedule.
7. Assign and level resources.

The main purpose of applying a project plan is to generate all required information to successfully execute a project. If important concerns are not discussed or not even discovered, the companies will suffer as a result of their own lack of planning and organization.

#### **4.2.2. Common techniques**

All of the respondents recognized Project Management (PM) as an important strategic tool for tackling difficult challenges. The respondents also mentioned several benefits, such as:

- Improved administration, control and coordination of resources and deliverables.
- Facilitated the decision-making process and offered direction.
- Allowed managers and employees to stay focused throughout the processes.
- Enhanced information throughout the processes.
- Assisted the project manager to evaluate the evolution of the job and the project as a whole (learning process).

When the respondents were asked about which techniques are the most commonly used in Argentina, they proposed; (1) Program Evaluation and Review Technique, (2) Critical Path Method, (3) Gantt Charts and (4) Microsoft Project. This finding is consistent with previous research (Fox & Spence 1998) which suggests that even though a large number of project management tools are available, most project managers only use a fraction.

All of the respondents believe that it is not common in Argentina to apply any formal project approach. The fact that three out of seven respondents, all from well-known multinational companies, confirmed to not applying any technique, is consistent with the general view of the respondents.

One of the respondents exemplified the company's practices: *"The established approach we have here in the office is to meet-up when we are about to consider a proposal. We discuss and delegate responsibilities and then start working. Closer to the deadline, I pick up the phone and ask how things are going"*.

It is interesting to compare these results to the findings of a North-American survey performed by Pollack-Johnson and Liberatore (1998). This study showed that project management software today is commonly utilized among professionals in the USA.

Comparing these results, three possible reasons for why Argentine managers do not implement project techniques can be assumed; (1) they do not recognize benefits, (2) lack of knowledge or practice, or (3) lack of commitment.

Senge (1990: 67) offers the following words:

*"[W]e tend to blame outside circumstances for our problems. "Someone else" - the competitors, the press, the changing mood of the marketplace, the government - did it to us. Systems thinking show us that there is no outside; that you and the cause of your problems are part of a single system. The cure lies in your relationship with your "enemy" "*

It is important to understand that the external problems, such as those mentioned in the Argentine context, can be managed internally. One important component of Project Management is Risk Management. Eric Verzuh (2005: 85) defines Risk Management as the means by which uncertainty is systematically managed to increase the likelihood of meeting the project objectives.

The respondents (except one who refused to answer) admitted that they had previously failed to meet objectives. Two of the respondents, who also work as consultants, estimated according to their personal experience, that 60 to 70 % of Argentinean projects fail.

Strategic planning is one of the main responsibilities of any manager. Previous studies

conclude that poor management is one of the leading causes of project failure. By sticking to outdated practices, many Argentine managers' danger their organization's objectives, and create serious internal problems out of the external contingencies.

Argentine companies and the top-management of these should therefore not blame the outside circumstances for their failures; rather focus on changing the organizational systems they are creating.

### **4.2.3 Human Behavior Aspects**

The first question raised in regards to human behavior aspects was related to whether the common techniques consider human behavior.

The findings show that the majority of the respondents suspected that the techniques did not take into account human behavior. Two respondents honestly admitted that they had never considered this aspect, and it should be mentioned that it did not seem as the other respondents neither had previously given the query any thought.

After some reflection, one of the respondents expressed the following: *"They are not considering the behavior aspects that we experience trouble with. As a matter of fact, most of the hours we (regional managers) spend during our monthly report sessions, we discuss the variables that are not present in our numbers"*.

Another respondent explained that he had developed a personal "reward and sanction system" in order to control undesired behaviors among team members.

These two statements indicate that these project managers are unconsciously aware of internal factors which are not regarded by the selected techniques. The managers assume that the internal factors could affect the outcomes and are therefore trying to create strategies to avoid them. It could be assumed that both approaches mentioned by the respondents can be considered as time-consuming and tiresome in the long run.

Goldratt claims in his book Critical Chain (1997) that it is necessary to develop a new project schedule which considers human aspects in order to secure the deliverables.

The author therefore introduces a schedule which maintains the traditional sequential approaches but redefines tasks and phases according to four behavior related assumptions: Activity Duration Estimation, Student Syndrome, Parkinson Law and Multitasking. Furthermore, how to avoid these pitfalls has previously been discussed in chapter 2.5, so the discussion will not include extensive strategies.

### **Activity Duration Estimation**

The first concept questioned is “Activity Duration Estimation”. This concept is based on Goldratt’s claim (1997) that people involved with projects overestimates or adds extra time as a protection against uncertainties.

The findings of this study suggest that it is common approach in Argentina to add extra time as a contingency into the schedule. Five of the respondents believe that in many situations, managers also added extra time as a precaution against uncertainties. Both these findings are congruent with the conclusions drawn by Steyn (2000).

One respondent also stated that the management of the firm is well aware of this type of procedures, which they have resolved by putting managers in charge of the estimations. Ironically did the same respondent admit to adding extra time and he was sure that his co-workers did as well.

Another respondent pointed out that he had also had experience the contrary, where team members were eager and therefore underestimated the task durations.

When the respondents were asked about how the “safety” was utilized, four out of seven believed it was wasted or spent on other tasks.

The majority of the respondents justified the behavior according to team members prior experience, lack of knowledge among managers, company culture, “pride of success” and “fear of failure”.

When the respondents confirmed the presence of this type of behavior in Argentina, they also unknowingly confirmed that Argentinean projects are longer than necessary. The importance of time can be best emphasized with the old saying “Time is money”.

There is a strong relationship between a project's time and its cost. A common project "rule of thumb" states that if the schedule goes 10% slower (a delay of 10%) will usually the cost be 30% of the optimum schedule.

The importance can be highlighted with common examples: (1) when the objective of a project is a new product launch, time to market is crucial. The cost of the delay is in this case much greater than the actual expenses. (2) In contract work, part of the process is penalties and incentives associated with completion. A company can save escalating penalties by avoiding hidden time or even receive rewards for early completion.

Another serious problem with this type of procedures is that the extra time added during the activity estimation is hidden. The project manager cannot separate the actual activity duration from the hidden safety. By not being able to separate the two, the manager cannot administer or control the time to its best purpose. The time is now in the hand of the activity holder, who can administer it according to the personal preference.

### **Student Syndrome**

The concept of Student Syndrome regards the behavior of students who often do not start their assignments until the last minute. The behavior becomes a problem when the students encounter a problem and the built in safety is already wasted. The consequence is that the students do not meet their deadline or they have to compromise the quality of the assignment. Goldratt (1997) relates this behavior to the business and project environment.

The findings of this study suggest that this type of behavior is common in Argentina. All of the respondents considered the concept to be natural human behavior and justified the behavior by multitasking, lack of planning, and other human traits such as fear or dislike of tasks.

Previous research (Steyn 2001, Duncan 1999) suggests that when contingency is built into the schedule, there is less pressure on the individual to start on the planned date. Relating this result to multitasking, where employees are working on more than one

task at the time, the individual is might be tempted or obligated to work on other projects.

Previous findings of this survey suggest that Argentinean projects are longer than necessary because of extra time being built into the schedule. The latest finding concludes that the extra time built into the schedule is wasted on behavior such as Student Syndrome. The direct consequence is that the employee jeopardizes the project deliverables.

To control the deliverables is one of the main responsibilities of a project manager. One respondent called upon the importance by saying that the student syndrome behavior is worsened if not controlled. Another suggested his own control system, by alerting employees about upcoming steps during project meetings. Goldratt (1997) suggest to prevent both Student Syndrome and Parkinson Law (see below) by first cutting project duration estimations into half, then apply “late as possible scheduling“, and finally prepare the team member on their upcoming tasks by an alert system.

To change a corporate culture or even natural human behavior requires a strong commitment from the managers. Alexander Laufer (1997:256) offers a checklist for how to monitor a team:

1. Systematic and Integrative planning. In order to ensure team agreement and on timing of transition, it is recommended to set objectives, employ multiphase process, start early and integrate plans.
2. Timely decisions adjusted to uncertainty. The author recommends to postpone plans, accelerate implementation and to plan for multiple horizons.
3. Isolation and Absorption. Effective suggestions are to isolate tasks, loosen connections and divide project.
4. Inward and outward leadership. The project manager needs to intensify communication with his team by actively influence the environment, manage decision making, intervene, and set an example.
5. Teamwork. The author suggests developing strong teams and sustaining teamwork.
6. Overlapping phases. The different project managers and teams should cooperate by involving downstream and execute in parallel.

7. Simple procedures. This includes develop standards and ad hoc, or share stories.
8. Intensive communication. One of the project managers prime responsibilities is to maintain communication with all stakeholders, especially to promote face to face and if necessary employ multiple mediums,
9. Systematic monitoring. A critical assumption is that the control is based on established assumptions, and the manager should always provide feedback.

The behavior of employees should not be a source of delay. To plan, administer and control a project are key responsibilities of any project manager. The direct consequences of poor management can be loss of revenue, dissatisfaction among customers, reputation and general waste of resources.

### **Parkinson Law:**

The third human behavior related concept is Parkinson Law. The concept states that individuals will adjust their levels of effort in order to keep themselves busy for the entire task duration. This implies that if a task is estimated for certain time duration, it will not take less time than predicted. Goldratt (1997) argues that this especially occurs in the project environment because it does not promote early finishes.

Very few of the respondents had previously heard about the “law” and therefore it became a necessity to offer an example. While five of the respondents consider Parkinson Law to be true, two respondents found it both interesting and rational human behavior.

Three of the respondents believed that the concept is closely related to motivation, and one of the respondents suggested promoting early finishes and offering incentives to the ones who comply.

In the article “Getting Out from Between Parkinson’s Rock and Murphy’s Hard Place”, Francis S. Patrick (1998) offers three strategies to avoid the impacts of Parkinson Law:

1. Build the schedule with target durations that are too tight to allow/encourage diversion of attention.



2. Get rid of due dates.
3. Change management with the responsibility to protect project resources from interruptions rather than getting in their way with unnecessary distractions.

All of these three strategies are previously suggested by Goldratt (1997). While the first two approaches can be regarded as technical and therefore easy to implement, the third could be considered as more complex.

To permanently change the organizational culture requires a strong dedication. According to the Critical Chain methodology, and as mentioned in chapter 2.5, it is necessary to first establish a culture which removes the fear of exposing safety, and secondly to embrace uncertainties rather than assuming that they can be beaten by adding safety into the schedule. Many TOC advocates suggest the analogy of a “Relay Race” where teamwork, preparation and task concentration is critical.

### **Multitasking**

The last concept to be questioned is Multitasking. The concept refers to when a resource has more than one ongoing activity or attends to more than one activity. In this situation, the resource juggles among tasks and projects in order to complete the processing and move on to the next activity.

The findings of this study suggest that Multitasking is a common activity in Argentina, and it is utilized in all of the different companies represented in the survey. All of the respondents also considered it to be a possible bottleneck when not dealt with correctly.

While two of the respondents stated that this was an actual and serious problem in their respective departments, three of the respondents considered it to be both an interesting and motivating factor, and a healthy part of business which made people feel more effective.

The findings of previous research (Rubinstein et al 2001) suggest that multitasking such as carrying out several duties at once, reduce productivity and can cost a

company 20 to 40 percent<sup>1</sup> in terms of potential efficiency cost.

One of the respondents recommended the following management strategies in order to avoid the potential bottleneck:

1. Delegate tasks correctly.
2. Empower the team members,
3. Communicate properly.
4. Balance the resources (prioritization).

Multitasking and Student Syndrome is often considered to be closely related and “partners in crime” when it comes to wasting the contingency built into the schedule. There can be multiple reasons for these actions. In his book, Goldratt (1997) contends that employees often responds to more than one project manager, who are all responsible for the respective outcomes. These managers will often expect progress from its resources, and due to the pressure, the employees will juggle between tasks in order to satisfy all. Steyn (2001) and Duncan (1999) suggest that when a safety is built into a schedule there is not as much pressure on the individual to start working on the task on the planned date. When the pressure is low the employee will be tempted to work on another project instead, wasting valuable and often critical time.

In order to not waste the critical time, Argentinean companies should therefore strive to avoid multitasking, or at least manage it consciously.

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<sup>1</sup> CNN, Interview with the researchers Rubenstein, Meyer Jeffery:  
<http://archives.cnn.com/2001/CAREER/trends/08/05/multitasking.study/>

## **5.0 Conclusions**

There is no doubt that surviving in a global market place is far from easy and that success is dependent on the management's ability to create and lead change. Since the evolution of modern Project Management techniques in the 1950s, many companies have recognized the benefits of organized project management combined with other business practices to deal with the complexity of the market place. But companies still suffer from projects exceeding the budgets, running late or fail to meet their objectives.

In 1997, Eliyahu M Goldratt presented an alternative approach, the Critical Chain Project Management technique (CCPM). The theory is based on the assumption that a project schedule should consider human behavior.

The purpose of this study was to investigate the possibility of employing the CCPM approach in the Argentinean marketplace and to determine whether the methodology's four underpinning human behavior related aspects (Activity Duration Estimation, Student Syndrome, Parkinson Law and Multitasking) were present. The whole research also aimed to increase the understanding of the Argentinean project management practices and to provide answers to the research questions.

In order to accomplish the objective of this study, the investigation consisted of a literature review and in-depth interviews. The literature review included a short presentation of Program Evaluation and Review Technique and Critical Path Method, which are commonly applied time-management techniques and also provide the basis for the CCPM approach. The chapter also included a review of the CCPM, the underpinned concepts and an implementation guide.

In-depth interviews were also performed with seven respondents, all from renowned companies familiar with project organization. Important information was collected from respondents, both from their employers and from the environment in which they worked. This information was utilized to draw conclusions on whether CCPM technique could be employed in the setting and to increase our understanding of the environment.

### ***5.1 Summary of Major Findings and Implications***

The main findings from the in-depth interviews imply that all four of the human behavior related concepts were present in the Argentinean project environment. The vast majority of the seven respondents considered the human behavior concepts; Activity Duration Estimation, Student Syndrome, Parkinson Law and Multitasking, as natural and to on a daily basis.

The respondents of this study suggested and ranked three main challenges as follows; (1) to secure the project deliverables, (2) To manage the consequences of changes in the political and economical frame and (3) To manage projects in a “Culture of poor planning and organization”. Undoubtedly, these results indicate that Argentinean project managers battle common project challenges, which require attention and commitment from the management.

According to the respondents, companies achieve great benefits from applying project management. Surprisingly, the findings suggest that it is still not common in Argentina to apply any technique to manage the projects.

If indeed these results representative for population, many Argentinean managers have a lot to learn about project practices and it is assumed that it probably will take a few years before it is a common practice. It is appears that other issues, such as external constraints, are more important to managers.

It is crucial that Argentinean managers recognize that external threats can be managed internally by applying disciplined approaches to control and minimize risk, and by these means, increase the likelihood of securing the project deliverables and the overall objective of the firm.

The overall contribution of this study was to confirm the presence of Goldratt`s human behavior concepts. By recognizing the presence of these concepts and employing the CCPM approach, the companies will obtain direct solutions to their challenges and problems, which are not considered by traditional project techniques or by currently applied methods.

## ***5.2 Future work and Limitations***

The Critical Chain Project Management approach is based on the assumptions regarding human behavior concepts discussed and tested in this dissertation. A possible limitation of this research is the number of respondents. Since only 6 stakeholders have been interviewed, it would be interesting to obtain scientific evidence (validity) about how the different stakeholder's statements and attitudes transfer to the rest of the population. This could be tested by interviews or observations.

Another possible limitation is the amount of previous research. Since the methodology is relatively new and has not been investigated to a full extent, a limited amount studies have been published by international journals. Most of the articles and books for the literature review were recommended by The Goldratt Institute of London, and The Project Management Institute only briefly comments the theory in their latest publication.

Leach (1999) has previously offered cases where CCPM has been applied and project duration has been reduced. It would be valuable to test CCPM as a pilot project (case study) in the Argentinean environment and examine the results from the implementations.

# **Appendix A**

## **Interview Schedule**

### **1. Formalities and scope**

- Information on the objective of the study, what are supposed to be discussed and what are the expectations. The main purpose is to get an overview of the project environment in the company and Argentina and to investigate whether the studied human behaviour factors are present.
- Ask whether it's possible to tape record the conversations.
- Information about confidentiality and anonymity in the presentation of the interview results.
- Information about the stakeholders (respondents) right to set restrictions considering the material to be presented.
- Information on the disposition of the interview: Open-ended (exploratory) questions where the answers or the discussion are not bound. The main idea is to have an open discussion in order to generate knowledge and understanding.

### **2. Topics and its related questions**

#### **The Project Environment in Argentina and the company in question.**

- Can you give an overview of what you think project management in general does for your company? What benefits does it involve?
- What are the most common challenges (problems) in the industry and your company?
- Has your company ever failed to meet the objectives of a project and how common do you think is in Argentina?
- Do you have a personal opinion for why this happens?
- What are the advantages for your company to deliver projects on due-dates or sooner?

#### **The usage of established techniques for project planning and scheduling:**

- According to your experience, which are the most common techniques adopted in Argentina?
- Which technique does your company apply, and why is that?

- Do you have any problems or do you see any problems with the usability of these techniques?

### **The human behaviour factor in project management:**

- To what extent would you consider that these techniques consider human behaviour?

### **Activity Duration Estimation:**

- In the case of task duration estimation, which technique is normally applied?
- To what extent do you think that project stakeholders overestimate or add extra time due to previous experience?
- Do you think team members protect their schedule from “global” cuts?
- Do you think that the different levels of managers add extra safety?
- In your opinion, what happens to this respective time if no uncertainties occur?

### **Student Syndrome:**

- To what extent do you think it's normal to always start the tasks at the established dates? In the case of no, what is the reason?
- To what extent do you think that team members might be aware of possible extra time and take usage of it?

→ Hypothetic question or example in case respondent does not understand question.

### **Parkinson Law**

- To what degree do you think people consume the time they have available?
- Do you think the project environment promotes/motivates early finishes?

→ Hypothetic question or example

### **Multitasking:**

- In your opinion, is it normal to work on more than one project or in the case of one project has more than one activity simultaneously?
- Would you consider this a possible bottleneck?
- What could be the benefit/challenge with this situation?
- Do you think that different project managers could stress the importance of their project?

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