

The Triple Constraint, A Triple Illusion

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Abstract

George E. P. Box stated “**All models are wrong. Some are useful.**” (1979, p. 202)

The Triple Constraint model is both wrong and not useful. It says that cost is a function of time and scope, that these three factors are related in a defined and predictable way. The Triple Constraint says that if we want to shorten the schedule (time) we must increase cost. It says that if we want to increase scope we must increase cost or schedule.

However, the data says otherwise. Why is it that the majority of projects that are over budget are also late? This runs contrary to the constraint.

Why is it that projects that are both late and over budget also have a tendency to under deliver (scope)? Again, this is not consistent with the Triple Constraint.

Yes, they can all be explained away. But that is exactly the problem. The Triple Constraint model has been with us for too long precisely because we are able to explain away the facts, rather than confront the model.

A new Triple Constraint is proposed which is supported by the facts and which will focus project managers and management in a new direction.

A poor mental model prevents progress and the Triple Constraint has done just that. It influences how we measure projects. We have used the measures of delivered functionality, actual cost and schedule versus planned for as long as can be remembered. Yet, despite the best efforts of many we continue to achieve relatively poor project results.

The Triple Constraint model is at the core of the problem. Our belief in the Triple Constraint has forced us to focus on the only other factor available, people, as the primary factor for change. People are important, however, they are only one component.

This presentation explores a new model, the Value Triple Constraint model that focuses project managers in a new direction and leads to the integration of Project Management, Process Management and Business Analysis.

Understand the illusion and throw off the albatross that is the Triple Constraint.

The Classical Triple Constraint

From a business perspective, a project is a limited time endeavour aimed at taking an organization from one level of measured performance to a higher level of measured performance. In order to determine if we have achieved the project objective we need good methods of measurement. If we measure the wrong things, then our focus and attention will be diverted away from the important. The classical Triple Constraint, as a tool for measuring project success, is inadequate as it does not allow us to measure how well we have succeeded with respect to the business opportunity. It measures the wrong things and diverts our attention away from the real opportunities.

Let us explore the classical Triple Constraint.

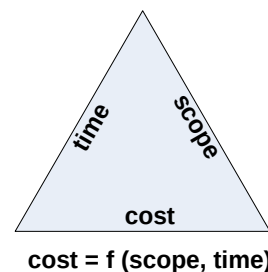


Exhibit 1 – Classical Triple Constraint

Triple Constraint: A framework for evaluating competing demands. Project managers often talk of a “triple constraint” – project scope, time and cost – in managing competing project requirements. (PMI, 2004, p377)

In fact, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* contains three separate knowledge areas directly related to the three factors of the Triple Constraint - Project Scope Management, Project Time Management, and Project Cost management..

The Triple Constraint says that cost is a function of scope and time or that cost, time and scope are related so that if one changes, then another must also change in a defined and predictable way. A key problem with the model is that it actually only contains two factors, one of which is expressed in two different ways. Let us explore the three factors.

Firstly we have *scope* which refers to content. We can easily understand that the more content we have to deliver the more effort and time will be required.

The second factor is *cost*. Cost usually refers to expenditures such as hardware or project long costs such as people costs. The thing about people costs is that it is arrived at by multiplying a cost by duration (time). So actually cost contains time, proving the adage that “time is money”. And herein lies the problem. Since time is money, then time is really part of cost rather than a separate factor. And so that reduces our triple constraint to only two factors leaving us with the following model which contains only two factors.

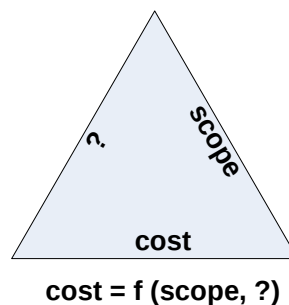


Exhibit 2 – Classical Triple Constraint without time

Whereas cost is a fixed factor expressed as money, time is a relative factor. A dollar on one project is the same as a dollar on another project. But a month delay on one project is different in its impact from the same month delay on another.

The second key problem with the model is that cost and time (budget and schedule) are not good ways to measure the business value of the project. We know from fact and experience that many projects which are delivered on time and on budget do not deliver business value. We also know that some projects, although they were completed over budget and late nevertheless delivered significant business value.

We can conclude that the Triple Constraint is neither useful for measuring project success nor for evaluating competing demands.

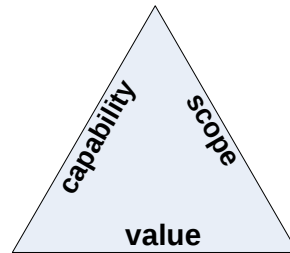
The Triple Constraint may have been useful on simple projects or on specific types of projects, like construction. However, it is not universal. It is time we replace it.

And so we present a new model, the Value Triple Constraint model which can be used for measuring project success and for evaluating competing demands.

The Value Triple Constraint (VTC)

We need to be able to measure the expected and actual business success of a project. We need a mental model that will help us to focus on where the opportunities lie. We need a mental model that will help us make the right decisions effectively. We need a tool that allows us to measure the net value delivered by a project and by the project management process.

In his book, “Don’t Park Your Brain Outside”, Francis T. Hartman states that “The only truly effective benchmark for project success is the long-term return gained on the investment in the project.” (2000, p. 13) Assuming that this is a reasonable statement we will express a proposed a new Value Triple Constraint as:



$$\text{Value} = f(\text{scope}, \text{capability})$$

Exhibit 3 – Value Triple Constraint

There is a relationship that guides all projects. It is relentless and honest. We can work against this relationship to our disadvantage or we can work to improve this relationship to our advantage. That relationship is the Value Triple Constraint.

It is written as: $\text{value} = f(\text{scope}, \text{capability})$. It is read: The value delivered is a function of the scope of the project opportunity and the capability of the process used to deliver it.

Let us explore what the components mean and what the relationship means.

Value – the outcome

The delivery of value is why we undertake projects. Value is a compound metric which is the sum of the following major elements:

1. Project Benefit (+)
2. Identification Opportunity Cost (-)
3. Decision Opportunity Cost (-)
4. Project Schedule Cost (-)
5. Project Delivery Cost (-)

In order to better understand each of the components let us explore the following example.

Example

Imagine that at some point in time, we discover a situation which if resolved will produce a benefit of \$1.2 million per year (\$100k per month). This is the *Project Benefit*.

Let’s also say that the situation which we have just identified has actually existed for two years. So we have lost two years worth of benefit or \$2.4 million because we didn’t recognize the opportunity earlier. This is the *Identification Opportunity Cost*.

Let's further imagine that it takes 6 months before a decision is made to actually resource a project to undertake this initiative. That means we have lost 6 months worth of benefit or \$600,000. This is the *Decision Opportunity Cost*.

Assume that the project requires 18 months to deliver; another \$1.8 million foregone. This is the *Project Schedule Cost*.

The *Project Delivery Cost* represents the actual expenditures of people and other resources. Let's say that this is \$2.4 million. This is what we normally refer to as the cost or budget in the triple constraint model.

The *Value* is the sum of all of the above. Since the benefit is a stream rather than a one-time amount we need to establish a duration or number of years. For our example, let us choose three (3) years and ignore interest and inflation.

Therefore Value looks like the following (in million \$):

Category	Impact	\$ M	\$ M	\$ M	\$ M
Benefit (3 years)	project	+\$ 3.6			
Identification Opportunity	mgmt		- \$ 2.4		
Decision Opportunity	mgmt		- \$ 0.6		
Schedule Opportunity	project			- \$ 1.8	
Delivery	project				- \$ 2.4
Subtotals		+\$ 3.6	- \$3.0	- \$ 1.8	- \$ 2.4

What this table tells us is the following.

1. Over a 3 year period we expect to see a total return of \$3.6 million.
2. The new expenses that we need to budget to deliver this benefit is \$2.4 million.
3. It has cost the company \$3.0 million is lost opportunity due to the time required to identify the opportunity and to decide to pursue it.
4. It will cost the organization \$1.8 million in lost benefits to deliver the project due to the schedule.
5. Benefit, Schedule Opportunity and Delivery costs are at the project level.
6. Identification and Decision Opportunity costs are at the higher management level, or Project Office level.

What conclusions can we draw from this picture?

1. The delay in identifying the opportunity is significant. This is almost always a hidden cost.
2. The organization has essentially spent \$600,000 just to decide to pursue the opportunity. This is also an ignored cost.
3. The value of one month of schedule time is \$100,000.

Why is it important to have all these components of Value? With the current Triple Constraint what we measure is strictly at the individual project level. We are not able to measure inter-project effects. For example, if we delay project A by one month in order to deliver project B one month earlier is that a wash? Our classic Triple Constraint doesn't even work across projects. On the other hand, the Value Triple Constraint does because we have treated time as a relative cost measure whose value is determined by each individual project. In essence we have respected the saying that "time is money". How much money the time is worth depends on the project.

The Value Triple Constraint model goes beyond the individual project and allows us to measure portfolios and even the project management process itself over time. We can compare how much value is generated one year as compared to another year. It allows us to measure not only the delivered value of each project but also the delivered value against the predicted or budget value. In other words it allows us to separate project success versus estimating success. The current model only allows us to measure estimating success. After all, budget and schedule on their

own have no meaning. But it also allows us to measure how much value we have left behind. This is a measure of how capable the organization is at finding opportunities and acting on them.

The Value Triple Constraint moves the focus away from the project manager to project management as a whole. It engages both management and users because now identification and quantification of measurable benefits becomes a necessary component. It allows the project manager to truly manage conflicting demands because it provides a measurement which includes the total effects of cost, opportunity and schedule into a single value that is project specific. In essence we want to accept a change in scope if it raises the relevant Value and not accept it if it reduces the Value. Such a decision is often not made at all on many projects because we work primarily with cost and schedule as separate elements.

A project manager sometimes lengthens the schedule to accommodate a scope change which on its own seems to be justified. This can lead to decisions which look correct but actually cost the organization because it has not considered Schedule Cost. For example, if we were to consider the fact that an additional month on the schedule means one month of lost benefit, then the change may no longer be justified. In addition, such justification needs to be driven by the business user requesting the change, not the project manager in isolation.

This model forces the business to take responsibility for establishing and confirming the benefit. It also focuses attention on the greater opportunity of identification and decision rather than solely on delivery. It provides us with the ability to attach a true cost to such things as user non-availability and resource shortages because rather than simple schedule delays, we can now show how these events change the Value of the project. In addition, it allows us to identify high risk, low Value projects up front. We can continue to focus on Value throughout the project and monitor Value changes rather than just budget and schedule changes.

Organizations actually only manage a small part of their true cost. The VTC highlights the importance of project identification and selection. It also stresses the importance of identifying, quantifying and revising the project benefit throughout. Without that metric only the project delivery cost can be determined and this may be a small part of the true overall cost.

The Value Triple Constraint requires us to quantify and validate project benefits when the project is complete. This attacks the practice of overstating benefits to get project approval and then abandoning that metric. The proposed triple constraint model gives us a better way to evaluate project success. It also allows us to focus our attention on where the true opportunity lies. If most of the cost is in the opportunity region, then there may be more opportunity in improving how we identify opportunities and how quickly we make decisions rather than improving our delivery capability.

It allows us as project managers to engage management and users more fully in the process and deliver greater benefits to the organization.

The Scope Component – a factor

The *scope* component does not change and, therefore, we won't spend any time discussing it here.

The Capability Component – a factor

The *capability* component is a new concept. Capability refers to the capability of the underlying value-added processes used to deliver the project. Different types of projects use different delivery processes. For example, a construction project will use different delivery processes than a software development project. We are not talking about the PM processes here but rather the value-added delivery processes. Capability is an emerging topic and since few projects have actually applied this concept there is not yet sufficient literature on the subject as it applies to projects. However, we know that there are techniques for measuring capability such as six sigma. What the Value Triple Constraint says is that for the exact same scope if we improve the capability of the underlying processes, then we will deliver more value.

As an example, if we reduce cycle time in our underlying delivery process, then we will decrease the Project Schedule Cost which will increase Value. It may also decrease the Project Delivery Cost.

Or if we speed up our decision making, then again we will decrease our Decision Opportunity Cost and increase Value. If we improve our Identification processes and select better projects, then we can increase Value even further.

Understanding and measuring capability requires Process Management skills, techniques and methodologies. This will most certainly be a required knowledge area for project managers in the near future and holds the greatest potential for improving delivered value through projects.

The Value Triple Constraint model is useful for the project manager. It is useful for the Portfolio Manager. It is useful for the Program Manager. It is extremely useful for the Project Office. It is a mental model that will lead to better decisions and which forces all parties to improve, not just the project manager.

Summary

The current Triple Constraint is a tool which leads to poor decision making and which ignores significant opportunity costs. It does not represent a true relationship since time is a dimension of cost and a relative metric.

The Value Triple Constraint is a more universal model. It can measure both project success and estimating accuracy. It can guide us in selecting projects and can motivate the organization to address the significant opportunities with opportunity identification and decision making. It also makes business users more accountable for quantifying benefits and attaching them to functionality or scope. The addition of the capability factor will encourage project managers and project management to pay more attention to the underlying processes used to deliver the project, not just the processes to control a project.

The Value Triple Constraint represents a true relationship among Value, Scope and Capability.

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