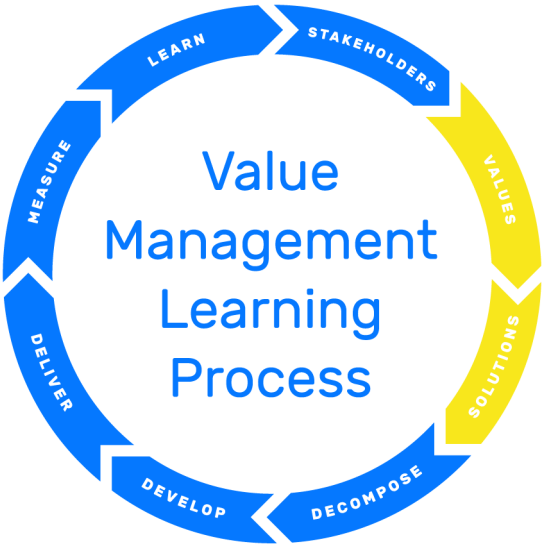
2018

Estimating Efficiency of Means for Ends:

A Dummies Guide to Impact Estimation Tables – extended version for Tom Gilb's Masterclass

– version 23.07.2018

TOM GILB



Introduction to this paper

Impact Estimation ('IE') is a method developed by the author for several decades. It is published in 'Principles of Software Engineering Management' (1988, Gilb) for example.

It is based on the idea that all **'value objectives'** (ends, needs) (including and especially all non-financial objectives) can be expressed *quantitatively*, so we know precisely what 'project values' we are planning and managing. This is a rare culture, but it should be the norm, if we are to know what we are dealing with on any project.

The second concept is that all **'means'** (strategies, solutions, architecture) for reaching our 'value objective goal levels' on time, *themselves* can be evaluated and measured *quantitatively*.Thus, we can manage all planning, and all project execution better.

The failure to quantify the impacts of our strategies is unfortunately widespread. So 'nice sounding management bullshit' prevails, with resulting waste and failure, which is so pervasive, for such a long time, that we take it to be normal, and perhaps unavoidable [12]. I think success should be the norm.

This paper will attempt a short (28+ pages, compared to 500 to 800-page books [1] on the subject) explanation for intelligent and curious beginners. It may be enough to allow you to practice the IE method reasonably well, without further study. It may simply motivate you, to do deeper study, and thus master these arts. You probably know that few people can master anything, without the proverbial 10,000 hours of study and practice. I did that for these methods in my time. I started about 1960. Although we would all like the cost of mastery to be less, it is NOT.
The more optimistic news is, that I have experienced some exceptional students, who have used this tool in impressive advanced ways, after only a 2-day workshop. But they are exceptional, and not all of us are.

I Other good news is that if you are *not* a genius (class: da Vinci, Edison, Einstein, Musk, Jobs), this method will make you *look like* one, to others. They all credit *their* success to lots of hard work [1].

Used Terms

The main Planguage Methods are as follows:

Requirement Specification: used to capture all the different requirement types. Emphasis is placed on specifying competitive performance and resource attributes quantitatively.

Impact Estimation: used to evaluate designs against the requirements. It is also used during project implementation to track progress towards meeting the requirements.

Specification Quality Control: used at any stage of a project to check the adherence of any plan, contract, bid or technical specification to best practice specification standards.

Evolutionary Project Management: used to plan and monitor implementation of the selected designs.

Value #valuefirst

Source: [6] Competitive Engineering

Value is perceived benefit: that is, the benefit we think we will get from something.

Notes:

1. Value is the potential consequence of system attributes, for one or more stakeholders.
2. Value is not linearly related to a system improvement: for example, a small change in an attribute level could add immense perceived value for one group of stakeholders for relatively low cost.
3. Value is the perceived usefulness, worth, utility or importance of a defined system component or system state, for defined stakeholders, under specified conditions.

"One man's meat is another man's poison." /Old proverb

4. 'Benefit' is when some perceived value is actually produced by, a defined system.
5. Value is relative to a stakeholder: it is not absolute. Quality, for example, is stated in terms of the objective level of 'how well' a system performs, irrespective of how this level is appreciated by any stakeholders. Some defined levels of quality only have a value to some stakeholders. The same is true for all attributes. There are many Planguage ways of indicating that a stakeholder values an attribute. These include using Value, Stakeholder, Authority, Impacts, and Source parameters.

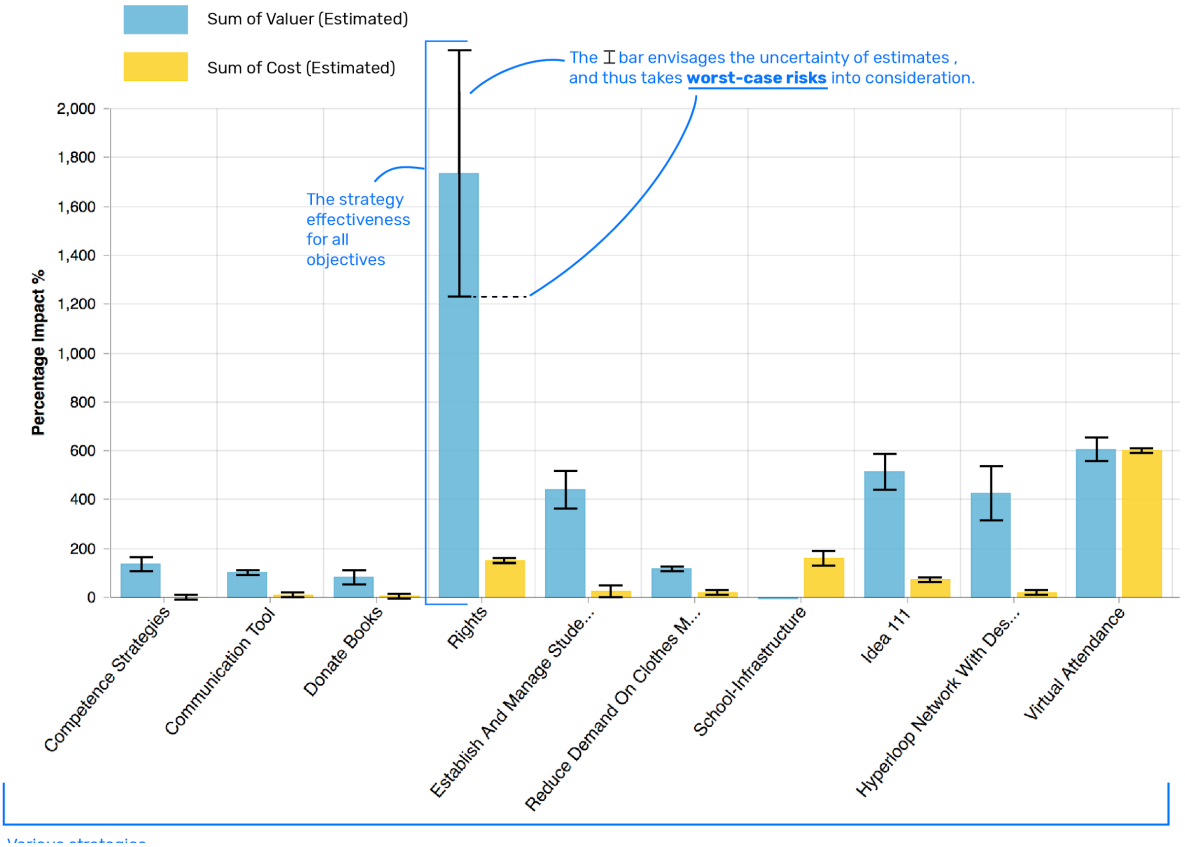
"Nowadays, people know the cost of everything and the value of nothing." /Oscar Wilde.

I The impact estimation discipline can give us a quantified overview over the overall (all objectives) effectiveness of all proposed strategies.

EXAMPLE

Source: Oslo 2017 OSWA Meetup, needsandmeans.com [4]

Impact Estimation diagram – result of table



IE diagrams can also show us the overall costs (financial, time, workforce, maintenance, decommissioning) of each strategy. We can then find the most cost-effective strategies (prioritize) and delivery them early, for continuous value delivery. We can also envisage the uncertainty of estimates (the 'I' bar), and thus take worst-

case risks into consideration.

Those who are so expert that they know all the right strategies, without any special planning method, might still enjoy using the IE tool to present and sell their brilliant ideas to others, like people with power and money.

You can't just say 'trust me, I know': you need to give some explanation of why:

1. your strategies really do fit their objectives and budgets,
2. other, worse, strategies do not.

The Basic Structure of an Impact Estimation Table

1-page overview of the Impact Estimation Tool / Table (IET).

I The core concept is to estimate the effect of solution ideas, on our value objectives, and our resources. The table lets us look at all our objectives, all our resources, and all our impacts.

You will see in the Figure just below, that there is a set of 8 related concepts to learn. The primary and simplest concept is that *there is a causal relationship* between your suggested **Means** ('Design Idea') and the **Ends** ('Objectives'). The **relationship** (i.e. the Impact of the *Design Idea* on the *Objective*,) should always be expressed **by a number**, rather than by vague expressions like 'good', 'fantastic', or other unclear and subjective words.

The impact relation will *always* be in *direct* relation to one particular quantified objective.

EXAMPLE

'Security: 95% chance to detect a hacker within 10 seconds, delivered by April 1 Next Year'

Not just as an impact 'in general', and 'for all purposes'. We estimate 'how effective a design is' for *our very particular purposes*.

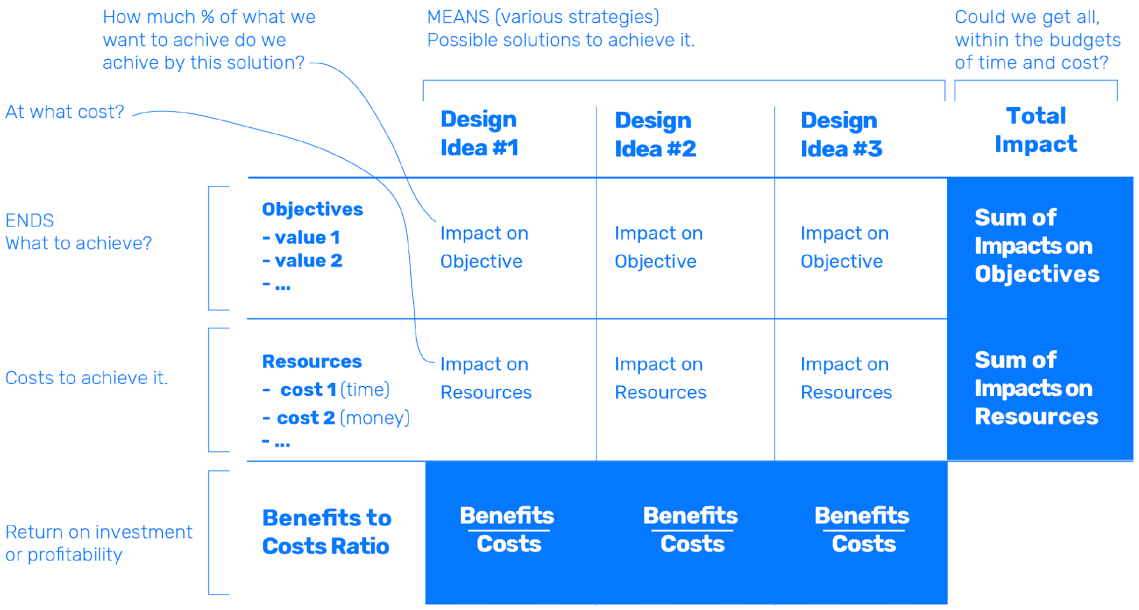
1. For example, if we estimate that the 'Design Idea' (e.g. the 'Means', 'Architecture', 'Strategy', 'Solution', etc.) will have *no* effect, that it will *not change* the 'current level' of Security at all, then we can use the expression '**0%**'. Meaning, the design *will not help*, and *will not hurt* our current level of Security.

2. If we believe that we would, using the Design Idea #1, achieve exactly the '95% chance of detecting a hacker', and this would really be delivered to our system 'no later than 1 April Next Year', then we can estimate that this Design will achieve 100% of our objective.

3. The estimation '50%' means that we expect, using the specified Design, to reach half way between our current Security level (0% based), and the 95% level, by the deadline (1 April Next Year). If the current level were 85%, then halfway means a 90% Security level is estimated to result.

DIAGRAM 1: THE BASIC STRUCTURE OF AN IMPACT ESTIMATION TABLE [14,

SHRIVER]



I **Impact Estimation** (IE) is an 'engineering' tool for the plans and projects that are *complex, large, long-term, risky, ambitious*. But, it is worth noting that Impact Estimation has been used to decide 'which top job to take' by one individual (Adi): a big enough, and complex enough, long-term decision from his point of view!

IE allows one or more human minds to communicate about their project, both as an abstract set of ideas, and later about results of real building actions. We bring in feedback from building steps, like stakeholder reactions, resulting perhaps in improved numeric objectives, or new better strategy ideas.

We measure the effects and the costs of the real project. Then we can also compare the estimates and results, with *reality*, and with progress towards our planned objectives. To better decide what to do next.

You don't ever ***have*** *to* use this tool. But maybe you need to know *more* about IE, to decide when and if to use it, wholly or partially. You can use IE either *simple ways* (a meeting 'conversation') [6], or by *advanced modelling of complex systems*, like Mars Missions (which my Lviv Business School students chose to plan), inspired by Elon Musk, Space-X and Mars Colonization, I guess.

This paper contains:

The Essence of Impact Estimation

Impact Estimation:

- clarifies the **relationship** between any '**means**' and any '**ends**'

How good is this idea? (idea = 'a perceived means-to-ends')

- articulates, *numerically,* the **side-effects** of any idea, on all other values you are managing

Does this idea help or hurt me in other areas?

- allows us to articulate our degree of **certainty**, or *uncertainty* about the *effects of an idea* on our critical values.

How risky is it to choose this idea?

- allows us to *summarize* both all *effects* of an idea, and all *costs* of the idea

How profitable is the idea overall? What is the total 'value for money'?

- allows us to *summarize* a specified *set* of solution ideas, so we can see if we probably have enough strategies yet, to reach our objectives, *before* estimating total costs, time to build, or committing to project or contracts. [1, Value Delivery and Estimation, Chapter 4]

Can we expect to reach our objectives? Or do we risk falling short of them?

- allows us to numerically compare alternative and optional ideas and pick a winner.

Which idea, or set of ideas should we go-for, now?
Pick winners based on facts.

The Culture of Impact Estimation (IE)

IE is based on a culture of **logic** [5] and **facts**. **Openness, transparency, honesty**. On **learning** from history and learning as we go. IE is based on **agility** of change; and **responsiveness** to current facts.

IE is trying to model the 'big picture', and all interesting related sub-pictures. IE can consider the very short term; next week, the very long term; life of the system, and any time-perspective, in between.

IE can both communicate the big picture in a few graphical bars [DIAGRAM 1], or you can drill down to any level of detail, of the real system, that is interesting. **It is similar to budgeting and accounting in that respect: but it is far broader than 'financial'. It can evaluate *any* critical stakeholder value, and *any* critical resource**

12 Commandments of Impact estimation:

that define its culture [5, The Logic of Design]

I. A number is the only clear way to communicate our values.

II. A value objective needs rich and realistic detail specified, about stakeholders and their circumstances.

III. Resource limitations, time and money budgets; need to be specified.

IV. All plans need to have documented and responsible sources.

V. We need a clear set of critical value-objectives, before we can seriously look at any solutions.

VI. All solution ideas must be judged, in relation to our particular objectives, all of them.

VII. When estimating the impact of a solution idea, the solution specification must be detailed enough, and clear enough, to permit reasonable accuracy of estimates.

VIII. The factual evidence for any estimate, and its source, must be included in the specification.

IX. We must be totally honest, up front, about our *lack of knowledge* for making an estimate.

X. The *range* for possible effects must be specified, not just a single number in the range.

XI. We need to estimate the side-effects of solution ideas, on all critical values, and all budgeted resources.

XII. All objectives, solutions, and impact-estimation details shall be done according to written good-practice rules, and this should be verified by quality-control, against those rules.

Now we have *not* explained 'why' we need these commandments, and we have not explained 'how to do them' fully. But this is available in the references [1,2] and to some degree in this paper. To some degree it is self-evident. Commandments are intentionally simple, and they define the culture of planning with Impact Estimation.

EXAMPLE

Source: A Real, Successful, UK National Health System Project. [13]

A simple but real impact estimation table.

HEALTHCARE SYSTEM IMPACT ESTIMATION

	Automate Rules	Web Self Service	Decision Support	Total Impacts
Increase Transmission of Requests *(30 minutes → 10 minutes)*	10 minutes 100%	3 minutes 100%	-	200%
Decrease Number of Errors Occurring *(353 per week → 30 per week)*	100 errors 80%	< 50 90%	-	170%
Decrease Time for Processing of Requests *(70 minutes → 10 minutes)*	35 minutes 70%	-	< 10 minutes 90%	160%
Decrease Time to Learn process *(1 day → 1 hour)*	-	1 hour 100%	10 minutes 103%	203%
TOTAL DESIGN REQUIREMENT IMPACT	250%	290%	193%	

The Basics of Impact Estimation

> The Basic '**Ends**': The objective, or requirement. The value or quality we have chosen.

We must start with 'how good' stakeholders want to be in the future [5]. These 'ends' have many names, but they are all of the same essence: they are 'levels of goodness' that stakeholders would like to reach in the future.

Some of their many names are: *requirements, targets, goals, constraints, needs, objectives, performance, values, benefits, critical factors, and qualities* (in Gilb's glossary you can find detailed explanations of all those notions).

We have concluded that they are, by their nature, *variable*, rather than 'binary' (present or absent). That means we can, and do, use descriptions like; *enhance, improve, better, competitive level, difference, reduce, maintain*, and more, to *describe* their desired or current *levels* of 'goodness'.

The fact that we treat these values as *variables*, means that we *can* ***always*** **expect to use** ***numbers*** to *clearly express* ideas, of the *exact* levels of the values.

For some purposes, like emotional political presentation ('Make Our Country Greater'), and for really small non-critical systems, words are sufficient: *'the clearly best security money can buy for my personal website'*.

But for many serious purposes, we believe that *using numbers to express value ideas* is the *minimum viable tool,* if we want to be successful, and to avoid waste and failure.

There are large percentages of international planning culture that do *not* understand this idea, practice this idea, or even know *how* to practice it. They are not trained, and they have no culture of 'quantifying quality' and 'quantifying non-financial values'. I blame the business schools for this! [15]. They never did 'balance the scorecard'. [8]
Here is the most-basic specification structure we use, in 'Planguage' (1, 2) our semi-formal planning language, of which 'Impact Estimation Tables' are a part.

Value Name	**<**	**this is a Tag, a cross reference name of the defined value below**
Scale	<	this statement will define the variable value, in such a way that we can 'put numbers on it'
Past	<	this Planguage parameter will give us 'benchmark' information about the level of the value in current or competitive systems or products
Tolerable	<	this parameter will specify a future 'worst acceptable case', 'constraint' level, of the value. 'Less than Tolerable' levels are defined as 'some degree of failure'.
Goal	<	this parameter will specify a planned and committed level of 'success' in future.

EXAMPLE
Hacker Security

Basic requirement specification (ends)

Hacker Security

Scale	Maximum average Seconds it takes to detect at least 95% of all hacker attacks
Past	1,000
Tolerable	10
Goal	1

Advanced requirement specification (ends)

Hacker Security	
Scale	Maximum average Seconds it takes to detect at least 95% of all defined [Hacker] attacks from defined [Source] of defined [Type] towards defined [Target].
P1: Past	[2017, Hacker = Top Professional, Source = Russian Military, Type = Data Theft, Target = Political Party Databases] **1,000**
Tolerable	[2020, Hacker = Top Professional, Source = Russian Military, Type = Data Theft, Target = Political Party Databases] **10** sec. <- Presidential Edict
Goal	[2020, **Hacker** = Top Professional, **Source** = Russian Military, **Type** = Data Theft, **Target** = Political Party Databases] **1** sec. <- CIA Plan 1.1.2018

Notice how specific, clear, and unambiguous we *can* be, about a value; by using *several* Planguage tools [scale, past, tolerable, goal], not just the 'quantification' tool alone.

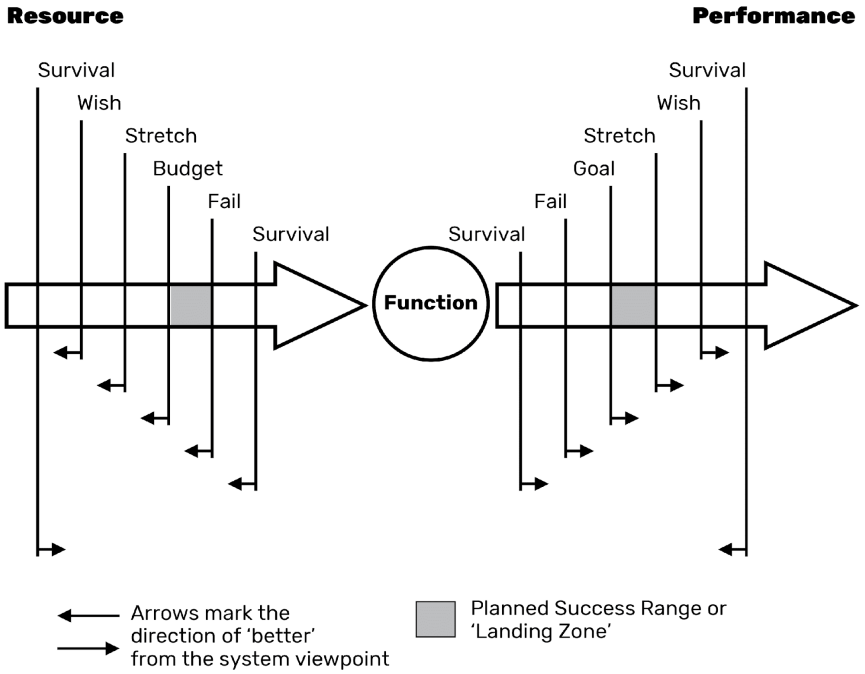
For Impact Estimation purposes, we have set up the 'ends':

1. we have *defined* the problem to be solved (get to the 'Goal level'),
2. we can now *evaluate* all proposed 'means', by *how well* they deliver the specified future levels (Tolerable and Goal).

These levels, Tolerable and Goal, also define our long-term priorities (as opposed to next week, short-term project priorities).

The 2 priorities are:

1. to at least get to the **Tolerable** level. (otherwise in failure mode)
2. to finally get to the **Goal** level: and declare official success, in getting to the specified target level.



> The '**Means**': the strategy, design, or architecture which 'has an impact'
>
> **Means -> Ends**

So now we have one, and usually many several, requirements. I like to prioritize the 'top ten critical objectives' at any 1 level [17]. **The requirements apply to the project. They define the project 'problem'. But the requirements are just a 'theory' of 'how good we want to be in the future'.**

We need a second 'theoretical process', *design*. We need to identify possible solutions, anything that might get us towards our Goal levels, and then evaluate these 'means' for effectiveness, and for their costs.

To deliver those value improvements, we have to *do something in the real world* to make them happen. These real-world things are called the '**means**' to the 'ends': they have many names: like 'solutions, designs, architecture, and strategies'.

We need enough 'means' to reach our 'ends'. Impact Estimation is the *process of keeping track of* what we expect to get, from the solution ideas. Sort of a 'budgeting' process.

Impact Estimation can be extended, from a pure planning tool, to *measuring the actual effect of* the individual solutions, if they are implemented gradually, one at a time. In other words, extended to support the entire project duration. This is analogous to a financial accounting system, tracking financial activity.

Project Processes

1. Clarify the problem: value objectives and constraints. Desired Values and resources.
2. Identify and evaluate possible solutions to the problem: 'Impact Estimation'.
3. Develop the system in small steps of value delivery: measure progress and learn. Impact Measurement.

We can decompose [1, Decomposition Chapter] large strategies, for example those that cost a lot, or take a long time to implement, into smaller - and gradually implementable - sub-strategies, for example at 2% of

total costs and times. See 'Decomposition' section at end of this paper.

Several advantages occur when we decompose strategies:

1. we can test out solutions early and gradually, at low risk of wasting resources on bad ideas.
2. we can, using Impact Estimation estimates, prioritize the sub-strategies which are estimated to deliver the best value for resources, and deliver those strategies early.

It is important that strategies are very clearly defined, so that we can more-easily and correctly estimate what we can expect from them, of value and costs.

General ideas like '*Best practice State of the Art Security Architecture*' are useless in terms of understanding their value delivery and costs. But my experience is that is the kind of poor specification level that real and large projects specify in their plans!

If the strategy is vague, then the range of effects and costs is uselessly wide. From minus infinity to plus infinity.

Impact Estimation is meaningful only when you are capable of specifying strategies which have fairly well-known values and costs, according to some experience.

PRACTICAL ADVICE

If you know absolutely next-to-nothing about the proposed strategies, you need to pilot them or try them experimentally, to get some data about their attributes for your value and cost problems. This data can be put into an Impact Estimation table, to improve your understanding of the strategies, for your purposes.

The Basic **Impact Estimate**

Means -> Ends =?

Read this 'equation' as:

'A given defined **Means impacts** (the Planguage 'Impacts ' arrow '->')

Ends is **Equal to** something to be determined' ('?'). = the impact estimate.

EXAMPLE

Hacker Security

Method X -> Requirement Y =-100 seconds (a reduction from current levels of minus 100)

There is an underlying assumption, that the introduction of Method-X is to a 'defined system'.
One way to define this 'system' is to use the 'benchmark' (a 'Past' statement):

P1: Past [Deadline = 2017, Hacker = Top Professional, Source = Russian Military, Type = Data Theft, Political Party Databases] **1,000 seconds**

We could symbolically clarify this by writing:

Method X [P1] -> Hacker Security =-100 seconds (reduction)

Note: 'P1' is a 'tag' and give us a simple cross reference to all the Past statement's information, like Source = Russian Military and 1,000 seconds as a benchmark level.

This means that Method X, when added to the 'system where the current level is P1', can expect to have an effect of a 100 seconds reduction. In our example P1= 1,000 seconds, and Method X is expected to improve that by 100 seconds. 1,000 -100 = 900 seconds result, after impact.

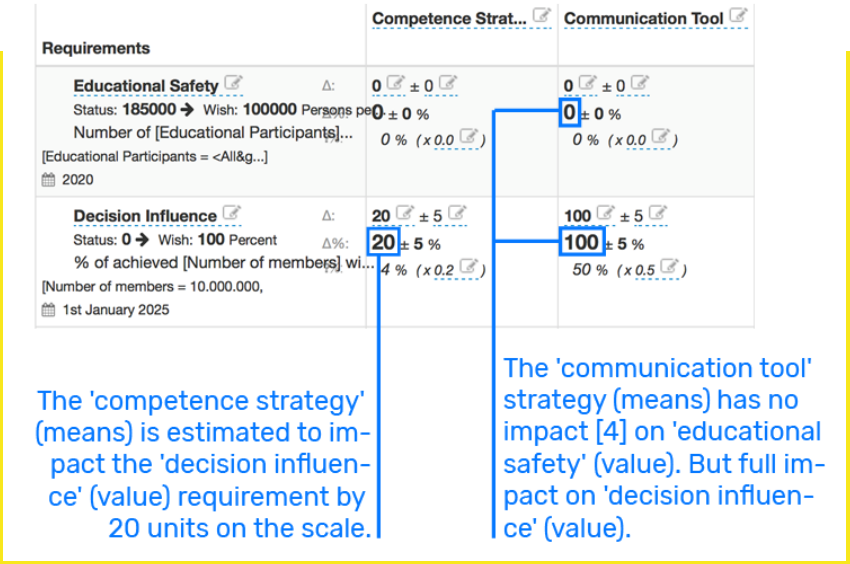
The expected result of deploying Method X is that we can detect the hacker in only 900 seconds.

EXAMPLE

Source: Oslo 2017 OSWA Meetup

The **expression**: a for many value

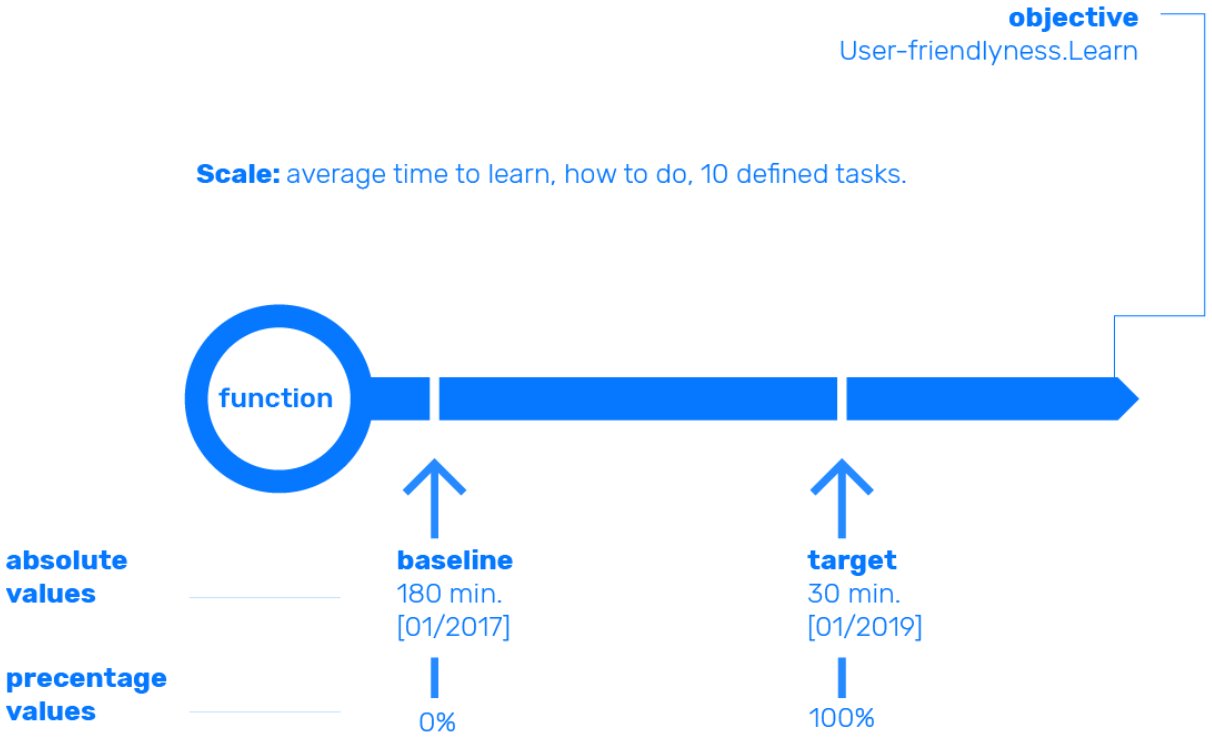
for expressing more-general '-100 seconds'. developed the "percentage of future level".



% Impact

'neutral' measure types.

There is a need this result in a language, than So, we have idea of the way to a



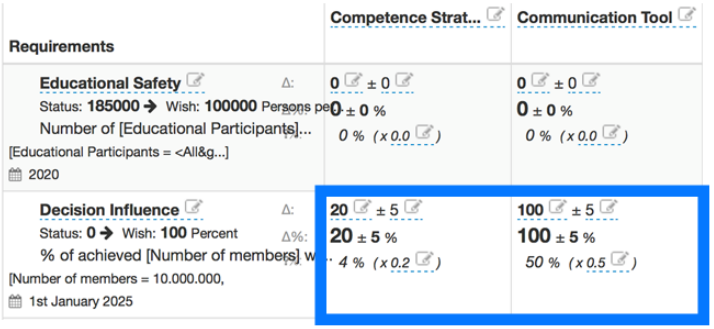
It works like this.

If the impact of the solution is estimated to 'get us all the way to a Goal level', then we use the notation **100%**: meaning the 'solution is ***all*** *we need*', '100% of what we need'.

If the solution has **no impacts**, does not move us towards our required levels, and *does not move us backwards* (become *worse* than the Benchmark, for example worse than a Past level), then we use the notation '0%'. This is a way of saying that there is **no impact** expected. See examples, at the circle, in the EXAMPLE 5, just above. 'Communication Tool' has no impact on 'Educational Safety'.

EXAMPLE

Source: Oslo 2017 OSWA Meetup



EXAMPLE

Hacker Security

In the simple example in the above text [The Basic Impact Estimate, 'P1'], the impact of '100 seconds', is a 10% movement from the Past = 1000 towards the Goal = 1 .

1000	---------->	**900**	----------	1
0%	---------->	10%	----------	100%

Getting to 900 seconds is *about* 10% of the progress needed, to reach the goal of '1'.

The major advantage of (automatically) converting our real-world 'seconds', or any other Scale units of measure, **into a '%'** is that we can:

1. .... add up the impacts on many different-Scale objectives and *get a better picture* of the *overall effect* of a single strategy, on the many **simultaneous critical objectives,** that we need to manage, and keep track of, in one project. See more detail on this below.

2. ... juggle many values [16]. The '% language' is a key tactic in helping us manage one type of *complexity*: the many additional simultaneous critical objectives, in addition to the (for example) 'Hacker Security' single objective, we might focus on for a moment.

3. ... present conclusions and recommendations better. '% change' is also a *convenient language for presenting technical ideas* to non-specialists (people who might not understand, or not *want* to try to understand, the Scale. 'For example, managers', 'non-specialists'. For them it is sufficient to say:

PRACTICAL ADVICE

This solution is estimated to get us 50% of the way to our Goal, but we need to find solutions for the other 50% of the way. These additional solutions are unknown today, and therefore their costs are totally unknown. Thus, it is too early to budget or look at deadlines.

The ± Uncertainty

EXAMPLE

Source: Oslo 2017 OSWA Meetup

Requirements	Competence Strat...	Communication Tool
Educational Safety Δ: Status: **185000** → Wish: **100000** Persons pe... Number of [Educational Participants]... [Educational Participants = <All&g...] 2020	0 ± 0 0 ± 0 % *0 % (x 0.0)*	0 ± 0 0 ± 0 % *0 % (x 0.0)*
Decision Influence Δ: Status: **0** → Wish: **100** Percent Δ%: % of achieved [Number of members] wi... [Number of members = 10.000.000, 1st January 2025	20 ± 5 20 ± 5 % *4 % (x 0.2)*	100 ± 5 100 ± 5 % *50 % (x 0.5)*

When I get an estimate from people, I ask a series of questions designed to *understand* their estimate better [6, Tough Questions]. And to get a *better estimate* from them.

PRACTICAL ADVICE

Source: [6] Competitive Engineering

Twelve Tough Questions

1. **Numbers**
   Why isn't the improvement *quantified*?
2. **Risk**
   What is the degree of *risk* or uncertainty and *why*?
3. **Doubt**
   Are you *sure*? If not, *why* not?
4. **Source**
   Where did you get *that* information? How can *I* check it out?
5. **Impact**
   How does *your* idea affect *my goals and budgets*, measurably?
6. **All critical factors**
   Did we forget anything critical to survival?
7. **Evidence**
   How do you *know* it works that way? Did it '*ever*'?
8. **Enough**
   Have we got a *complete* solution? Are *all* requirements satisfied?
9. **Profitability first**
   Are we planning to do the '*profitable* things' first?
10. **Commitment**
    Who is responsible for failure, or success?
11. **Proof**
    How can we be *sure* the plan is working, *during* the project, *early*?
12. **No cure, no pay**
    Is it '*no cure, no pay*' in a contract? Why not?

A full paper on this is available at www.Gilb.com

When someone says or writes "100", I ask them if that is an *exact promise,* from them, for the result. It can almost never be an exact answer. There are too many things affecting the real result, almost all of them are outside of our control.

In the real world all (an engineer or scientist for example) can, especially if they are very expert, only estimate a range of possible results. Nobody ever knows exact estimates. Weather people know they do not know the exact weather, and they are a pretty advanced 'estimation' culture.

The 'real expert' has pretty good knowledge of the *range* of possible results. The amateur does not even *think* the range-of-results is an interesting concept to work with.

So, one way to elicit this 'range of impact possibility' from people, is simply to ask for the *worst and best* levels they can imagine, or justify, from experience. For example: 'could be as low as zero seconds, and as high as 900'.

Impact Estimation is *not* intended to be an *exact* forecasting, and modelling tool.

We rarely know enough to be exact when we are dealing with at least ten Value Objectives, and at least ten best strategies. There are 100 (10x10) impact intersections there! We would be lucky to have very exact knowledge about even *one single* of the 100 impacts! We are, like most engineers and scientists, quite happy to initially get the right order-of-magnitude; and then work our way towards more-exact knowledge, if necessary, through trial and error.

Impact Estimation is initially intended to give us 'very useful approximations' (Value Budgets?).
'Back of the envelope calculations'. 'Scientific Wild-Assed Guesses'. To give estimates quickly (in days, not months).

We need, from these rough approximations, a basis for deciding 'pretty good actions' to take in the *short term*, in order to dive fruitfully right into the *real world*; and thus, to get some *measurements and feedback* about the *real* impact of proposed solutions on your critical values.

PRACTICAL ADVICE

If you can measure reality this week, while actually delivering some real value, then that beats wild guesses in the office or a meeting room.

We do not expect unreasonably great accuracy from Impact Estimation. We expect *useful enough accuracy, for our current purposes*.

How an impact estimation table deal with uncertainty?

So, in order to make us *think about the realistic range of possible results*, and also in order to *communicate that variation-possibility, of possible disappointment* too, and of 'risk of *deviation from someone's' expectations*'; we usually ask people to estimate a simple ± number for their estimate.

EXAMPLE

60**±20**%, or -100**±50** seconds.

And we hope to get the 'order of magnitude' (±2, ±20, ±200) of the range. And we hope that this will make people think better, communicate better, analyze better, and prioritize better, as a result.

| **Credibility**, **Evidence** and **Source**

But this is not enough. We have more 'tough questions' [6] that normally are useful to ask, and to expect reasonable answers from.

I believe that we need to understand, *where* the estimate of the solution impact is coming *from*. We have to decide if we want an *evidence-based, fact-based culture*: or just pure subjective guesses based on little real

knowledge.

Because if you settle for *very subjective* estimates, that is what you will get. We need to try to get as near to the objective truth as we can, but *within reason* [9, Startup Week]. All costs of getting facts need to be justified by their value. Perfect truth, and perfect quality, has a rough cost tending towards infinity. Pretty good facts will best be based on *actual measurement* of what a solution measurably delivers.

So that sets a limit on how much effort we are going to use for *theoretical* estimation, before we, like good scientists and engineers and marketers, dive in and try it out. *Just do it*.

PRACTICAL ADVICE

However: it is generally very good practice to ask for the following, for any and all estimates:

1. **Evidence** - specify the actual *facts*, that you base your estimate, and the range on: real measured examples of the use of the solution.
2. **Source** -specify and document the ***source*** of your facts (an internet link for example, a person) so we can check it out directly, for quality control purposes (and to make sure you did not *make it up*!).

We then use the evidence and source data, to summarize the 'credibility' of the estimate, on a scale of 0.0 (no credibility) to 1.0 (perfect credibility [1, 2, 4]. When most of your estimates have credibility in the 0.0 to 0.2 range, you begin to realize that your ideas are not very credible.

PRACTICAL ADVICE

Source: [6] Competitive Engineering, p. 274

Credibility Rating	*Meaning*
0.0	Wild guess, no credibility
0.1	We know it has been done somewhere
0.2	We have one measurement somewhere
0.3	There are several measurements in the estimated range
0.4	The several measurements are relevant to our case
0.5	The method used to obtain the several relevant measurements is considered reliable
0.6	We have used the method/design/idea/strategy in-house
0.7	We have reliable measurements for the design idea in-house
0.8	Reliable in-house measurements correlate to independent external measurements
0.9	We have used the idea on this project and measured it (Evo step, pilot and field trial)
1.0	Perfect credibility, we have rock solid, contract-guaranteed, long-term and credible experience with this idea on this project and, the results are unlikely to disappoint us

PRACTICAL ADVICE

If you want your ideas to 'sell' to the 'Board' then you need to 'up' the credibility. You need to do what is customary engineering culture. You need to base your solution suggestions of 'stuff known to work' based on 'hard experience'. Forget all those faddish current ideas that everybody is going for. The untried unproven stuff, that promises all good things to all people. You need to select some more-solid credibility strategies and solutions, that will more-probably work as advertised. You need to *reduce* the risk of failure, and *up the probability* of success.

How does an Impact Estimation use this credibility factor?

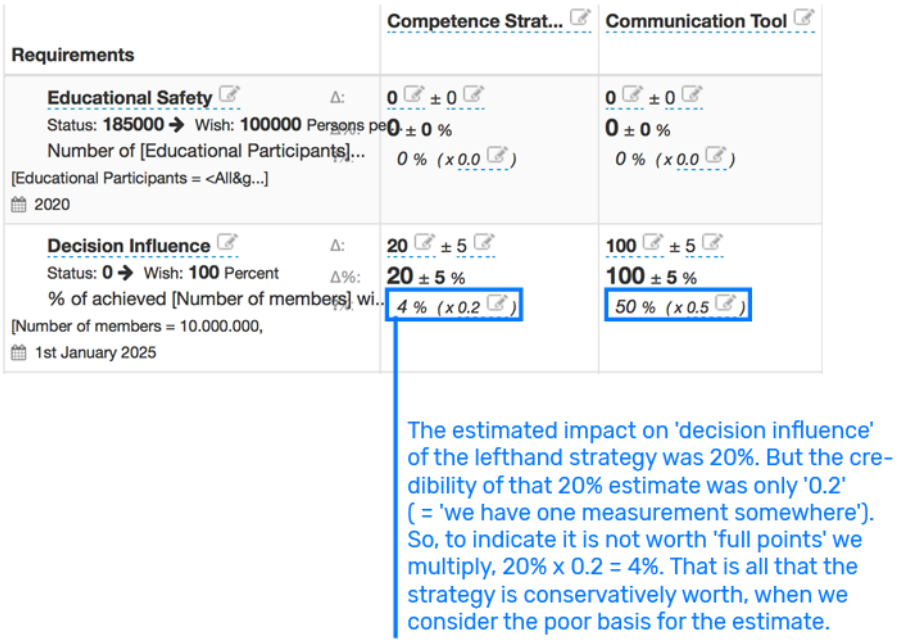
We multiply the estimate by the credibility factor. 60% x 0.5 = 30%

We cut the optimistic initial estimate down a bit, to avoid over optimistic unfounded sales arguments. If

people do not like the 'impact' reduction of their favorite toy, then the only way to defend it is to provide better evidence. Like science does.

EXAMPLE

Source: Oslo 2017 OSWA Meetup



Safety Factor: Adding up a set of Strategies

If I have a number of strategies, that together might partly meet my value goals, then I need to answer the question: 'If I do them all, will I then meet my goals?" and 'If I do them all, is it possible I will still not meet my goals, and I need more or better solutions?"

EXAMPLE

If

Goal A has	Strategy 1	Strategy 2	Strategy 3	rated as adding up to
	30%	**50%**	**20%**	**100%**

Does that mean if I do all 3 strategies, I *will* surely reach 100% of my Goal level?

No, but it is a good start. There is hope.

PRACTICAL ADVICE

There are several problems in adding up these individual-strategy estimates.

1. they are *each* based on 'if we did this one *alone and first*'.
2. *none* are based on 'if the other ones were *already* implemented.
3. the estimates all have their varied uncertainty and credibility.
4. strategies might add up, but they might be synergistic (2+2=5) and they might thrash (destroy one another, 2+2 =3)
5. so, you will never really know, until you do them, but we need *some* advance evaluation.

Engineers, and other disciplines like car driving (distance to the car in front), have a solution. They use a safety factor. They simply say, let us overdo it to the point where it will work 'no matter what goes wrong', meaning *reach the Goal* level. In spite of unforeseeable problems.

PRACTICAL ADVICE

A good general default rule, is to *design for twice as much* as you want and *hope to get what you want* in spite of problems and unforeseeable obstacles. But in practice, depending on the maturity of your discipline, you will have to adjust your safety factor, to reflect *what works in practice*.

So, when the numbers for your set of solutions, add up to about 200%, that *might* be the level of design you are going to need, to meet your goals.

EXAMPLE

Source: A Real, Successful, UK National Health System Project. [13]

	Automate Rules	Web Self Service	Decision Support	Total Impacts
Increase Transmission of Requests *(30 minutes → 10 minutes)*	10 minutes 100%	3 minutes 100%	-	200%

Either one of the first 2 strategies might be enough (100%) to reach the '10-minute goal for transmission of requests for pharmaceuticals in a hospital ward. But we have a safety factor of '2', a sort of 100% extra back up. If one strategy does not quite meet the goal level, then the other one can be deployed as a reserve to try to push us over the goal level.

You might wonder if this 'over-design' doubles your costs. NO, it doubles your rough high-level *design* costs, which are trivial. An extra day's work sometimes. Assume you can implement one idea at a time, incrementally, and measure progress towards your goals (agile). If you reach your goal with only half of the strategies applied. Then you are done, and do not have to use resources implementing the other ones, that you had 'in reserve'.

Side Effects

You might have designed a solution to meet *one particular* objective, say 'security'. But, like it or not, that security solution will have effects, good bad and ugly, on *other* objectives and on your resource budgets.

To understand this kind of strategic planning you have to look at the t*otal set of effects* on *all* other critical objectives (the other 9 or so) and on resources (time, money, people, maintenance costs).

Now, you can be tempted to ignore these side effects, but if you wait until nasty side effects pop up in practice, then, you will by then, have used up, and lost, far more resources, than those needed to estimate as we recommend, and then avoid, those side effects. It pays off generally to tackle this potential problem upstream.

Good engineering practice is 'to be interested in negative side-effects', and 'deal with them early' (agile), at the design stage, by finding better design, 'Lean'.

My experience with Impact Estimation is that the majority of side effects are positive, many are neutral, and only few are actually negative. It is similar to a chess move, which has many possible effects, some positive and some negative. But the chess player will not survive by evaluating the move in one single dimension only!

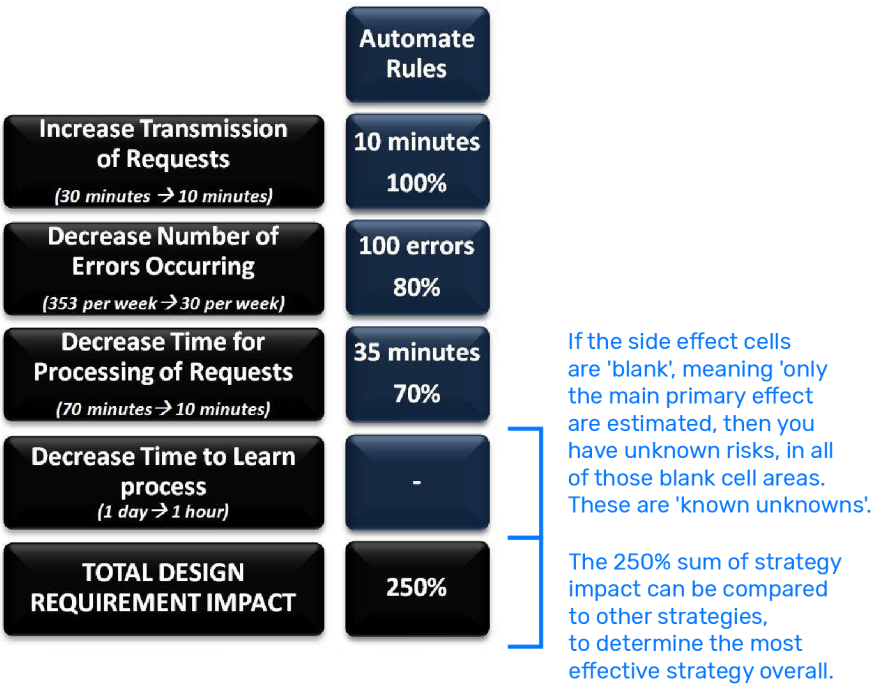
Evaluating side effects, especially the many *positive* side effects on all the other objectives, gives us a far better picture of the effectiveness of a single strategy. Just as it would a chess move. This gives us a better basis for prioritizing strategies, for early delivery, based on their overall effectiveness, for the entire set of top-level critical objectives.

The Impact Estimation Table, invites us to evaluate the side effects of *all* of our solutions.

EXAMPLE

Source: A Real, Successful, UK National Health System Project. [13]

Example of a strategy (automate rules) with 3 evaluated effects, and one not evaluated.



Resource Estimation: cost aspects of strategies

Simply estimating the effects of a strategy, on our critical objectives, as discussed above, is not enough. We need to consider several *cost* aspects of the strategies too. If we do not estimate costs, we risk uncontrolled cost overruns. We cannot write blank checks or give out our debit card pin code freely. But I see too many organizations that do exactly that. No real cost perception.

In particular, we have to consider strategy impacts on *stipulated* and *limited* resources, such as delivery deadlines, and capital project budgets. We might well go further and look at the impacts on future recurrent and one-time costs, such as maintenance, licenses, and decommissioning.

If we fail to evaluate these cost side-effects of a strategy, then we are doomed to make very bad decisions on the strategies. IT systems are already internationally famous for rampant cost overruns, and deadline overruns [12]. I do not think there is much research in the way of research into the recurrent future costs, nobody really cares 'that far ahead', nobody is held responsible, everybody pays. We will get what we deserve from this irresponsible planning.

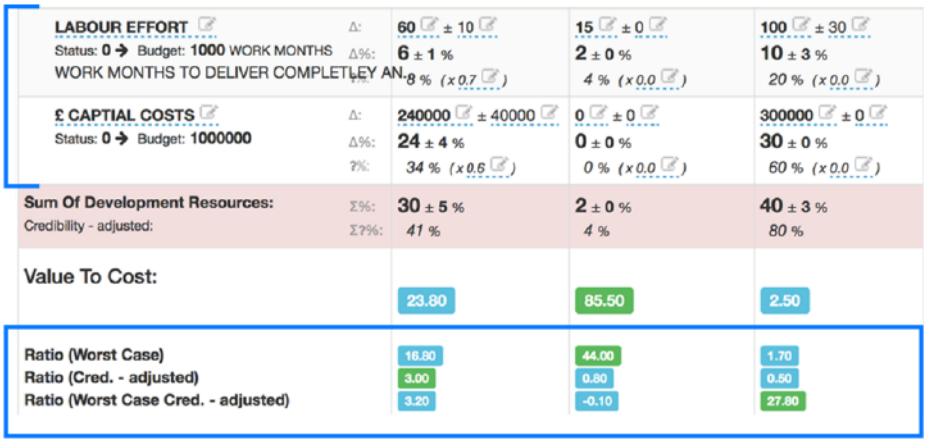
So, IE Table users, are at liberty to include any resource-consumption evaluations on the IE table, so that we get a much better picture of the cost side-effects of choosing a given solution.

EXAMPLE

Source: BCS London workshop. This example used the needsandmean.com app [4].

This costs estimation allows us to calculate the overall '**efficiency**' of a strategy!

The IET evaluation of two resources for 4 or more strategies. This, combined with the impact estimations on the main objectives, allows us to calculate the value-to-cost ratio for each individual strategy suggestion.



LABOUR EFFORT Status: 0 → Budget: 1000 WORK MONTHS WORK MONTHS TO DELIVER COMPLETLEY AN.	Δ: Δ%: ?%:	60 ± 10 6 ± 1 % 8 % (x 0.7)	15 ± 0 2 ± 0 % 4 % (x 0.0)	100 ± 30 10 ± 3 % 20 % (x 0.0)
£ CAPTIAL COSTS Status: 0 → Budget: 1000000	Δ: Δ%: ?%:	240000 ± 40000 24 ± 4 % 34 % (x 0.6)	0 ± 0 0 ± 0 % 0 % (x 0.0)	300000 ± 0 30 ± 0 % 60 % (x 0.0)
Sum Of Development Resources: Credibility - adjusted:	Σ%: Σ?%:	30 ± 5 % 41 %	2 ± 0 % 4 %	40 ± 3 % 80 %
Value To Cost:		23.80	85.50	2.50
Ratio (Worst Case) Ratio (Cred. - adjusted) Ratio (Worst Case Cred. - adjusted)		16.80 3.00 3.20	44.00 0.80 -0.10	1.70 0.50 27.80

The last 3 'ratio' lines in this example are the value to cost ratios, with respect to risks. First the 'worst case' for the range (± uncertainty), then for the 0.0 to 1.0 credibility of the estimate quality. Then last line, for the combination of both uncertainty and credibility. The green number is the best ratio.

PRACTICAL ADVICE

The *profitability,* if you like. This is a much better basis for choosing, and for prioritizing, any one strategy. It amazes me how unusual it is to see people evaluate such costs, for each strategy, in widespread planning practice. They simply try to estimate to overall costs, and delivery times, for a *total* package of *all* strategies, which is a very inadequate process, and generally doomed to give wrong answers, as experience shows us.

We need multiple cost-types (money, people, time, maintenance) estimations, at the outset to enable us to intelligently choose efficient strategies: *not simply* capital cost to build a new system.

Then we need early real system feedback, from incremental delivery of value-bearing sub- strategies, in order to *confirm* the costs, or to give us early warning flags, that something is badly wrong; in time to make adjustments, to get back on track. This was done professionally in the Cleanroom practices at IBM [1, 7].

Prioritization: which strategy should we do first?

If you had infinite resources, time, money, workforce; then you would *not* have to prioritize. You can have it *all*. But resource limitations are very real for our projects, and we all are mortal. So, *we always* need to prioritize. We need to choose some things to do, before others; and some things may *never* get done, before a resource runs out.

We constantly prioritize in our daily life, what to do now, today: whether to take a breath, or make a remark, or eat, or sleep. Life is a constant stream of prioritization, of decisions about what to do *just now*.

One big mistake in planning methods, for example Balanced Scorecard [8] is that we try to prioritize up front, in the beginning. The usual method is to give things a *fixed weight*, for example on a scale of 1 to 6. This is a stupid as saying the day you are born that sleep has a higher priority than breathing and breathing has a higher priority than eating. Nature doesn't work that way. Prioritization is not done once for all at the beginning. Not for factors that are all concurrently critical, and where any one of them, if neglected, can kill you. Balance. Priority changes! Each in turn. Constant dynamic reprioritization, to get balance. Enough sleep, enough air, enough food, enough sex, enough warmth...

Impact Estimation gives you the information you need to 'prioritize'. You can use IE to prioritize which project actions are best to take; from the first week of project [9], throughout the duration of the project [9], until no more resources are available to do anything.

Let me be more direct. I believe that too many popular methods for systems planning are badly founded on up-front fixed-weight prioritization, and that this method (which I also used from 1968-88, until I woke up) is unnatural, unintelligent and doomed [10]. The only reasonable prioritization method is the one used by your body, by nature. It is based on continuous re- prioritization, so as to get reasonable balance of the critical survival factors, and the comfort factors. I sometime dramatize by saying it is 'God's own method of prioritization', and you are arrogant to think you know a better method!
We have to choose our own local and current prioritization policies. There is no one prioritization rule. It depends on your current situation, as you step-by-step progress a project. But you should have a clear idea of what *rule* you are using to prioritize actions.

The potential prioritization rules
that Impact Estimation data permits you to choose or to 'compute'

1. do whatever the powers-that-be, fancy, or they choose
2. do whatever we think will please defined critical stakeholders
3. do whatever has the highest estimated impact on one single objective
4. do the strategy which has the best effect on all critical objectives
5. do the *subset* [11, Decomposition] of the best strategy, that has the best effect, on overall top level critical objectives, or on one particular objective
6. do the strategy with best value-for-resources ratio score on the IE Table
7. do the strategy with best value-for-resources ratio, considering 'worst case' range of uncertainty
8. do the strategy with best value-for-resources considering credibility-of-estimate rating
9. do the strategy with best value-for-resources considering credibility-of-estimate rating AND worst-case range of uncertainty
10. and other combinations, of these and other factors, for example with regard to one-or-more stakeholders [3], or any other factor you have specified in your plan

When you are evolving a system step by step, in 50 or more evolutionary value delivery steps, you can, at each step, choose a different *rule for prioritization* that makes sense at t*hat particular step* only.

But a good 'default rule' is to choose the action, that the IE table says will give the *most overall effects on all your objectives, for the least costs*, in terms of scarce resources.

Using that method, you can hope to get 80% of the value delivered for 20% of the resources: well you have a fair hope of something *like* that.

By definition, if you have the typical set of the *top ten best strategies* in the table, then the average strategy will cost you about 10% of your total resources. This, in our opinion is too much to gamble away, if the strategy fails.

EXAMPLE

A week ago, I went to the Casino in Madeira, to place my usual roulette bet, as I do at Las Vegas. €10 on Red and walk away win or lose. I have walked away doubling my money every time, and this time too. But I

had a narrow escape, since the just previous spin of the wheel was a zero. No player wins. But you can see from this, my attitude towards risks. Small bets and learn fast. And don't throw good money after bad. I really enjoy my gambling habit.

Project management, in cutting-edge new technology and competitive environments, is a gamble. We really know very little about how that cutting-edge technology will work, in *our* environment. We estimate it will be 'hot'. But ... maybe not.

PRACTICAL ADVICE

So, our Evo method [9B] recommends decomposition down to about 2% of the whole budget, or alternatively to 'weekly' value delivery steps. Every step should contribute to 'movement towards your set of critical goals'. But, if a step fails, or disappoints you, then *deal with it immediately*. You have not lost much (2%, a week), and you can 'walk away' from the 'roulette table' if necessary.

This was also done professionally in the Cleanroom practices at IBM [1, 7].

This sounds like a good idea, but people wonder how to do it, when they cannot see how to decompose their large strategies or architectures, into 10x smaller, partial-value, delivery steps.

Decomposition

A 10 Objectives by 10 Strategies Impact Table is great for management overview, for the big picture. But, it is too rough a cut for the real world of large and complex projects.

We can decompose an Impact Table to any useful level of detail we want, by a factor of ten for medium projects, and factor of 100 for larger projects. We can build sub-tables which directly relate to the top level but are more detailed.

We can decompose any objectives we want, by a factor or 10 or more. We can also decompose any strategy to the same levels of detail. But, ... how?

There are many practical principles and approaches to this decomposition, and they are detailed in the references [1, 11]. We will however, give the reader a taste of the decomposition methods.

Decomposing Objectives to High-Value Delivery Steps

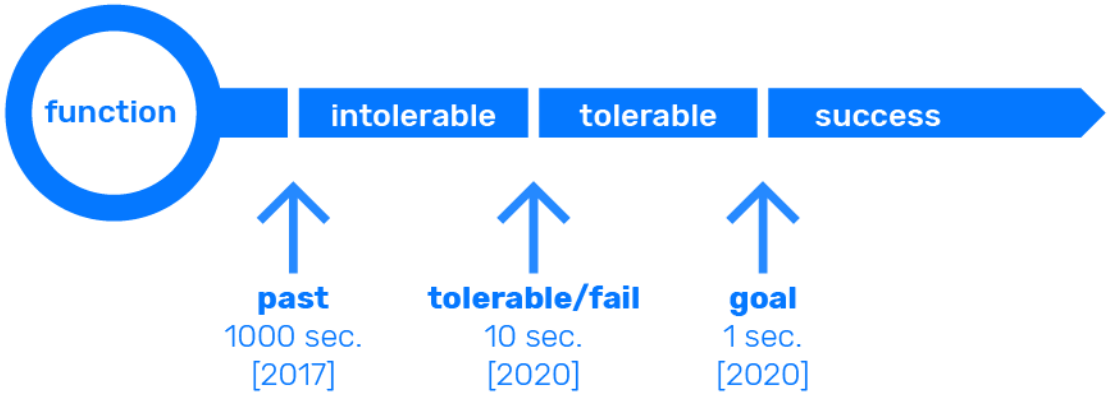
One simple way to decompose an **objective** is to use 'Scale Parameters' as we illustrated in this similar example earlier

EXAMPLE
Hacker Security

Hacker Security	
Scale	Maximum average Seconds it takes to detect at least 95% of all defined [Hacker] attacks from defined [Source] of defined [Type] towards defined [Target].
P1: Past	[2017, Hacker = Top Professional, Source = Russian Military, Type = Data Theft, Target = Political Party Databases] **1,000** sec.

Tolerable	[2020, Hacker = Top Professional, Source = Russian Military, Type = Data Theft, Target = Political Party Databases] **10** sec. <- Presidential Edict
Goal	[2020, **Hacker** = Top Professional, **Source** = Russian Military, **Type** = Data Theft, **Target** = Political Party Databases] **1** sec. <- CIA Plan 1.1.2018

Even in this example above we have decomposed into *two* basic levels of concern: The *Tolerable* statement is our **first priority to survive** (10 Sec.). Later we can try to go for the *Goal* level (1 sec.), **second priority to succeed**.



By choosing any *time series* of deadlines, we can divide up the problem into a series of increasing value, as time goes on. For example, 2020, 2021, 2022.... 2030.

But we have four other parameters to play with. **Hacker, Source, Type,** and **Target**. Let us say each of those had 10 possible definitions (10 **Hacker** types, 10 **Types** of hacking etc.), and all combinations are valid. Then we have about 10x10x10x10 = 10,000 combinations plus the time factor. That should give us *much smaller* subdivisions of the objectives, our 'problem statement', than we *ever* need for the *largest* of systems.

Of course, we will never do 10,000 Objectives statements (maybe 10-20 maximum), but we have no lack of opportunity. What we *will* do, is ask, 'which combination is the *highest value set* of parameters?'

Let us just say that 'we agreed that the *highest-value* combination was':

Goal	**[Deadline = 2021, Hacker = Top Professional, Source = Foreign Power, Type = {Data Theft, Denial of Service}, Target = International Political-Related Databases]** **2 sec. <- UN Plan 1.1.2, 2018**

And, say that this Goal represented something like 20% of all total estimated project value that we wanted, but that it could be achieved at an estimated 2% of the Financial budget. That sounds like a good deal! 20/2, or 1,000% value for money. Keep doing that, maybe only one step at a time.

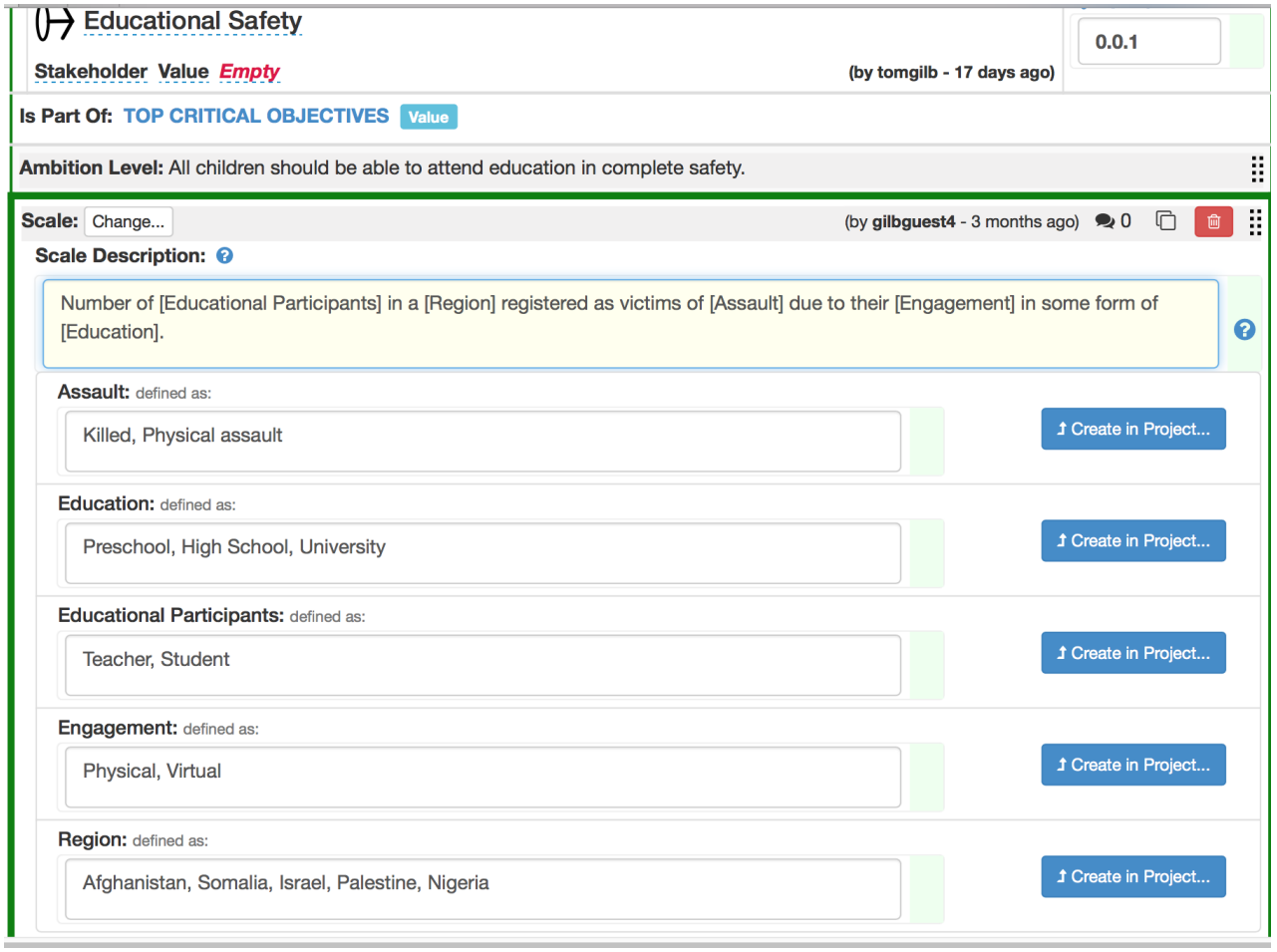
One step at a time to avoid over-planning, and to give opportunity to learn from experience as we go, and to get important results faster.

EXAMPLE

Source: Oslo 2017 OSWA Meetup

Example of 'Scale Parameters' in defining 'Educational Safety'.

Hopefully you can see from the simple example the powerful and practical tool you have got, by using the [Scale Parameters] in an Objective specification. The Scale Parameter combinations lead so directly to decomposition options, that you could actually automate it. In fact, the **NeedandMeans.com** tool has enough information to do that: the limiting factor being knowing which combinations valid, and which combinations are valuable. Right now that takes human domain expertise.



Notice that when we declare the scale parameters in the scale, the tool automatically recognizes them and sets up a window below for us to define them ("assault: defined as Killed, Physical assault"]. These definitions are automatically available when we specify any levels on the scale like goal level.

Decomposing Strategies into High-Value Strategy Delivery Actions

I believe that almost any big strategy, or architecture, solution idea, or 'means', can be usefully decomposed into *much smaller* (10x, 100x) **value delivery steps**. The value of this is that all such sub-strategies can also be estimated separately on an IE table. And then we can separate the best value/cost sub-strategies for early implementation.

I also know that many professional people do not believe this arbitrary and universal decomposition is possible. They have not been trained in methods to do this and have never been in a culture that does value-decomposition on a regular basis.

The request I make, when teaching my planning courses, is to take a strategy, and divide it into about ten parts. The ten parts, tagged D1, D2... D10 must fulfill the following conditions:

1. they are altogether a complete description of the Strategy for value delivery, as estimated.
2. every sub-strategy can be implemented independently of any other.
3. every sub-strategy will deliver some part of the total expected value.

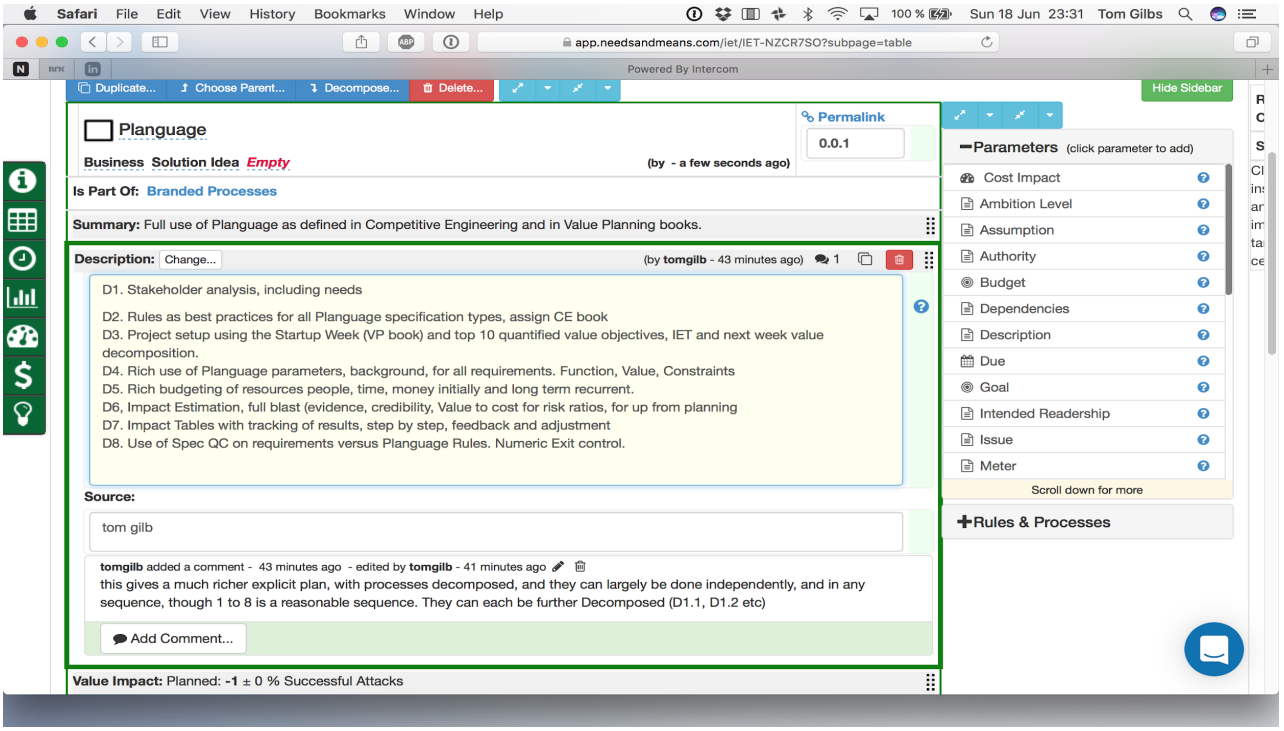
This last point (3.) is a challenge. You cannot have any *partial* process steps such as 'analyze', 'contract for', or 'test and measure delivery', unless *they alone* deliver measurable value, as defined by the Objective. Each step must be a *complete* end-to-end solution, that *delivers real value, all by itself,* when integrated into the target system being evolved. And we must usually start from the currently available, old, system, no matter how bad it is.

I All projects, I think, are based on delivering increased value. But people get very caught up in 'building new systems', to replace or 'modernize' the old ones. They lose sight of value, and they fail to deliver real value, too often. Most people do not focus on value, they focus on 'construction'.

EXAMPLE
Source: [4]

Decomposition to subsets of strategy where each one of D1 to D8:

- can be done independently of the others,
- will deliver part of the value,
- as a set (D1-D8), makes up the whole of the 'Planguage' strategy.



These sub-strategies can easily be put into an IE sub-table, so we can evaluate *each one* for expected values and costs.

Levels of Consideration

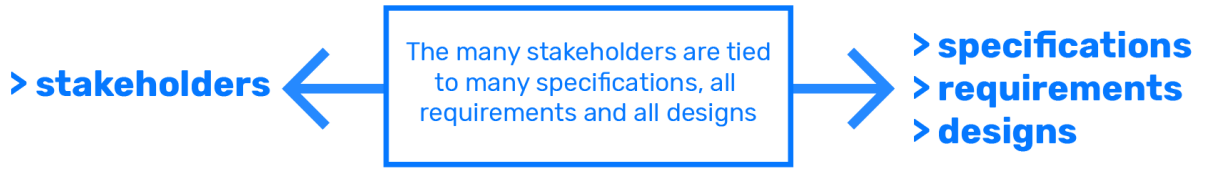
Impact Estimation tables can be used to represent any useful arbitrary level of your stakeholders, their particular objectives, and their relevant strategies to meet their objectives. All of these 'stakeholder' tables can be directly related to higher levels of overall planning.

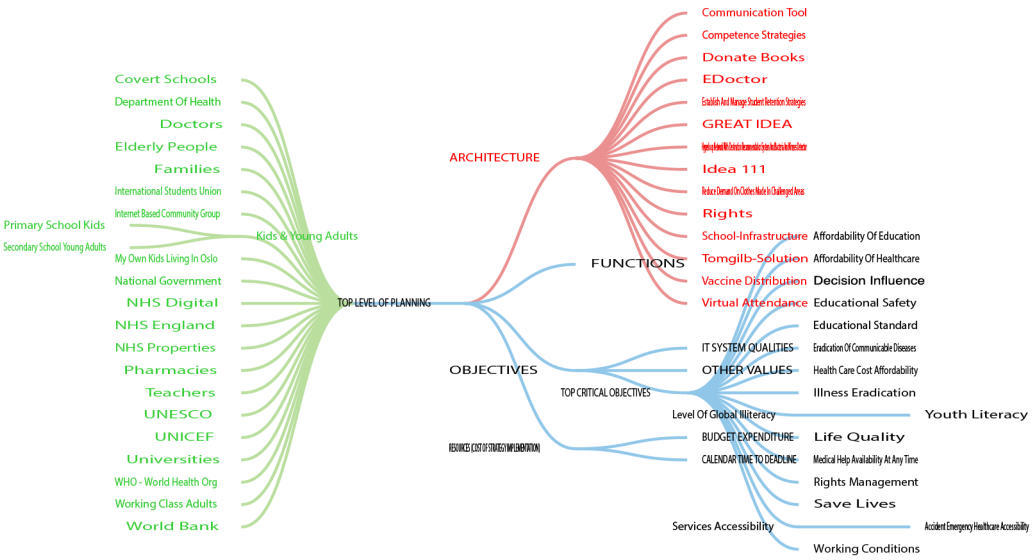
Stakeholder: Any person, organizational group, or inanimate specification; with an interest in, or ability to affect, the system or its environment.

EXAMPLE

Source: Oslo 2017 OSWA Meetup

Each one of these by definition, has interest in some of the objectives of the project.





You need to keep track of exactly which value objectives they are related to. In this case 'educational safety' and affordability of education'.

You need to keep track of any useful number of stakeholders for a single objective, and any number of

useful objectives for a single stakeholder. This kind of background information is available 'at a click' in the needsandmeans [4] tool's impact estimation table.

Summary

Impact Estimation is a way of 'modelling', communicating, and documenting the relationships between stakeholders, objectives, and our 'strategies for delivering the value'. Value is defined by our specified and quantified value objectives.

To our knowledge [3, PhD study] the Impact Estimation method is unique in terms of the power of dealing with objectives and strategies, in a quantified and richly-described way.

Impact Estimation can be used for initial overview planning (value budgeting), and can be then used continuously throughout the project, to capture, and track, measured value delivery, and costs (value accounting).

This value/cost feedback can be used to adjust anything useful, early ('Lean'): such as strategy specification, level and timing of objectives, and resource allocation.

Impact Estimation is deeply related to the Planning Language ('Planguage'); with its rich means of expressing objectives and strategies; as well as to the Evolutionary Value delivery agile process ('Evo') and to the Specification Quality Control [1) described in depth, in the books 'Competitive Engineering' (2005, [2]) and 'Value Planning' (2016-7, [1]).

Impact Estimation is applicable to any 'ends and means' relationship specification, in any discipline. Management, Engineering, and IT, for example.

If you do not understand how to quantify all value objectives, and how to quantify the impact of all value strategies, then you will not be able to successfully manage or plan, large or complex systems.
This is true of all systems engineering and science, and other management or IT planning is no exception. This IE and Planguage discipline is essentially a type of 'engineering', and we need better 'management engineering'!
Stick, then, if you think these practices are 'beyond you', to simple stuff like planning your journey to work. I am weary of people sticking to simpler [12] practices and wondering why they fail!

Learn these powerful methods, if you want 'super powers' [18] for complex-and-large plans and systems.

But be careful, there are lots of people out there, in your organization, who prefer to keep things **too simple to succeed** [12].

But they *are* quite happy and get well-paid for their 'failed projects'. And will usually blame something else for their failures.

As my electrician son is fond of saying, good tools are half the battle.

Request for feedback to tom@gilb.com

I Thanks for reading my paper. That alone makes me believe you are exceptional! You have a bright future!

It is natural that you might need to read it slowly, or several times, because it is packed with new concepts. Take your time! But I hope you think it is worth some effort.

I would love to know who you are, and what you are most interested in, so don't be shy, brighten my day, and send an email right now (later never comes), with remarks, requests, suggestions to make this paper better, or more useful for you. Report failed links please!

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If you are interested in courses, in house training, conference lectures, conference workshops, in- house consultancy, and coaching, that is what my son Kai Gilb and I do for a living: see www.gilb.com. We are resident in Norway (near Oslo) and London. We hold public courses regularly in Oslo (some in English) and London, and some other places (Kai in NL).

If you want to use our methods for a charity, or an educational institution, let us know. We are soft-hearted and Green. And want to help you make the world a better place too.

If you want to include these ideas in your own papers, books, presentations, and training materials, you are very welcome. Credit properly (Source: tom@gilb.com, www.gilb.com), and send us a copy please for our information. Permission granted! No charge.

Now, which friends, students and teachers do you want to email the link to?

Thanks! Mange takk! (norwegian)

References

[1] **Value Planning** (digital book manuscript)

Get 50% discount on Value Planning

Use this link: https://goo.gl/MB6kaR

Coupon Code: CONNECT

[2] **gilb.com**

Gilb Website many free papers, slides, cases, videos, blogs. at http://concepts.gilb.com/file24

Including free pdf of my book **Competitive Engineering**, which defines Planguage and Evo. https://w.gilb.com/p/competitive-engineering

[3] **Impact Estimation: IT Priority Decisions**

Lindsey Brodie: PHD on IE Modelling. By request from L.brodie@mdx.ac.uk

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This tool is not a necessity for doing Impact Estimation Tables. We have used flip charts and spread sheets for decades. Shakespeare did not need a word processor, but he might have used one today. We love this tool, and it helps people to learn faster and practice better, our methods. The tool is not least a Planguage tool [1], for all elements of planning; the Impact Estimation table is just part of the toolbox.

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Mills, H. 1980. **The management of software engineering**: part 1: principles of software engineering. IBM Systems Journal 19, issue 4 (Dec.):414-420. Direct Copy: http://trace.tennessee.edu/cgi/viewcontent.cgi?article=1004&context=utk_harlan Includes Mills, O'Niell, Linger, Dyer, Quinnan p- 466 on

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C. One Week Startup Planning for Projects; Front End to Evo - '**An Agile Project Startup Week**': Papers and slides Talk slides pdf from ACCU Conference, Bristol UK, April 9 2014 90 minutes talk. Includes Startup Planning for Business Startups, Confirmit, US DoD case, 2 Bank cases, Detailed Startup week outlines and links to sources. http://www.gilb.com/dl812

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"The principles and application of Planguage for Managing System Innovation" http://www.gilb.com/dl582 / Great real pharmaceutical hospital case with real improvements.
"Planguage for Managing Systems Innovation" slides: http://www.gilb.com/dl583
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Worth reading

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[2] **Everyday Superpowers** paper http://concepts.gilb.com/dl914