Real Options means

- You don't have to decide now, but you **know when you have to decide.**
- You keep as many options open for as long as possible.
- You actively gather information until the moment you have to decide.
- You only commit when you *must* or when you have a good reason to.

Why would you want to do that?

- Later you are smarter, you know more, you have more information. You can deal with uncertainty.
- You can deal with risk. You can wait and see what happens. If you have several options open, you can go with the one that best deals with the risk when it arises.

A Real Option has (like a financial option):

- A **value**.
- An expiration date. Or more general and correct: an **expiration condition**. The option is open until condition becomes true. Then you **have** to choose.
- The **cost of 'buying'** the option and of **exercising** the option.

Optimal decision process

- For each decision, identify the options available.
- Identify the last point at which a decision can be made. i.e. the conditions to be met to make a commitment. Decision time = deadline – option implementation time. The first decision is made before the first option expires.
- Until that expiry date, continue to look for new options and refine or expand existing ones
- Identify option(s) for each condition case and know ahead of time which option to exercise given a particular condition.
- Attempt to push back the decision time. Quite often this is free or very low cost. To do this, we need to be able to implement the option as quickly as possible. During slack time, work on how to speed up the process.
- Understand that cost optimisation is not the same as revenue optimisation or risk reduction. Sometimes it is worth investing in more than one option even though this may cost slightly more. After all, options have value.
- Wait to make decisions... and wait... and wait... until conditions are met.
- When you need to make a commitment and act... do so as quickly as possible. And you can proceed with confidence because you know you have made the best informed decision possible.

Real Options *is* just common sense. Real Options are just choices. Its strength comes from providing a structured and common approach to decision making for groups of people. It goes against intuition, much like Agile and Lean: when under stress we *really* want to take decisions. It takes strength to postpone the decision.

Real Options is not procrastinating: you postpone the decision until the latest *responsible* moment. You identify when the last responsible moment is, so that you know exactly when that moment comes. While options are open, you actively go after information that will inform your decision.

Real Options in Lean and Agile

User Stories

Stories are an option that the customer takes to add a certain feature to the product. Option buying price is the effort to write the user story, determine acceptance tests, elaborate it deep enough for the developers to estimate, the exercising price is the number of story points. The decision must be taken before the release when you want the feature. Of course, you can change the release plan during the release.

TDD/Refactoring/Simple design lower the price of implementing new requirements late in the project. Thus, they push back the time when the customer has to decide what will be in the project. They enable the story option.

Short increments and iterations

In the optimal decision process we calculate the time to make the decision by going backward from the deadline by the amount of time it takes to implement the option. If the time it takes (one increment) is short, the decision can be taken later.

Similarly, **SMED** (Single Minute Exchange of Dies) reduces machine changeover overhead, so that production can proceed in smaller batches.

Set-based design

Toyota already had the fastest product development process. The innovative Prius had to be developed even faster: less than 18 months. So, they looked at plenty of options:

- 20 types of suspension were considered
- 20 vehicle designs were entered in a competition. 5 models were worked out in detail. 4 clay models were made. 2 prototype models were made and revised. 1 model was chosen.
- 80 types of engine were considered. Testing narrowed this down to 10. After more extensive testing, four types remained. The four types were evaluated carefully through computer simulation. One alternative was selected.

Toyota plan the design process using the optimal decision process.

Efficient? Maybe not. But effective? Who do you think of when I say 'hybrid' or 'green car'?

"*Senior managers have told us that one of the hardest and most important lessons they teach young engineers is to delay decisions until they have considered a broad array of alternatives. One of the advantages of getting many opinions from many different people (through **Nemawashi**) is that many alternatives are brought to light that can then be systematically evaluated*"

Source: The Toyota Way-Jeffrey Liker, pp 239-240 "Broadly consider alternatives with a Set-based approach"

Lean Product Development System principle #2: Front-load the Product Development process to explore alternatives thoroughly

"*The manager's job is to prevent decisions from being made too quickly... but once a decision is made, we change it only if absolutely necessary*" Toyota General Manager of Body Engineering

Source: The Toyota Product Development System - Morgan & Liker p39