Technology forecasting for strategic decision making - An Introduction
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Technology Lifecycle - Seasons, Clockspeed - Part 1

So, let us discuss about technology lifecycle.

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technology life cycle

Assume that in technology forecasting, the clear region about technology lifecycle allows us to get necessary knowledge and necessary information to take strategic decision.

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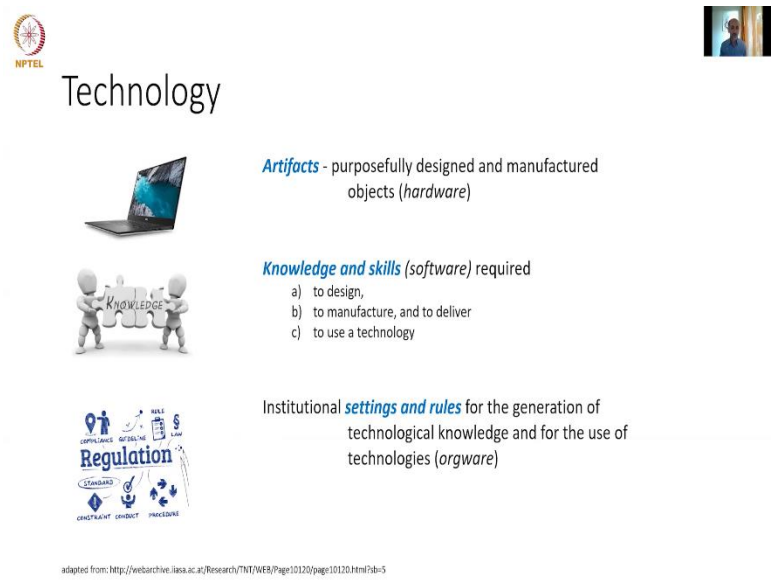

But before discussing about technology lifecycle, let us just recall how do we define technology. If you looked at the information technology that we use, for instance laptop and we have to have a knowledge in order to use laptop. Without those knowledges, this is just piece of plastic and silicon that can be even not switched on if we have no knowledge how to switch it on and how to operate. But it is not enough just to have a knowledge how to use a laptop.

We have to also have some regulations. We have to, we usually, when we install some software, we sign a license, we have to follow the rules, we have to have internet in order to be connected and so on and so. So, usually when we looked at the technology, we consider technology as a summary of these three main components. The first component is this artifact.

The artifact, usually this is a purposefully designed and manufactured object. Or it can be named hardware because it is a hard, something hard. But without knowledge and skills to design this hardware to manufacture, to deliver and to use this hardware, we have no technology. At least we have to have a knowledge and skills how to use this stuff, this artifact. Otherwise, somebody without this knowledge can use the laptop like support for the coffee. It can be also used like that.

But it is not enough in order to have a running technology, for running technology, we also have to use, to have institutional settings and rules for a generation of technological knowledge and for use of technologies, because without standards, without regulations, no technology can be

installed in the market. No technology can be really become innovation. It means something which is in regular production, something which has a market.

So, when we predict technological future when we are talking about technology life cycle, we are talking about lifecycle, not only of artifact, but we are talking about lifecycle of also knowledge and also rules. If we just make a short recall of history, at the beginning of 20th century, we had some technical systems, for instance, when we had a transportation means, not with internal combustion engine but with the animals, we had one kind of rules on the road regulation.

Today, those rules are obsolete. Today, the drive of the car, he or she does not need to have knowledge, how to manage vehicle which is driven by animals, okay. Those knowledge and skills are obsolete today. And those artifacts are obsolete also. We need to understand that technology lifecycle, it is not only lifecycle of artifact or hardware, this is also a lifecycle altogether.

So, for us in border of this course, technology, this is also, this is always synergy of three component - artifact, knowledge and skills and settings and the rules, which we use in order to operate our technology. Let us see from point of view of lifecycle.

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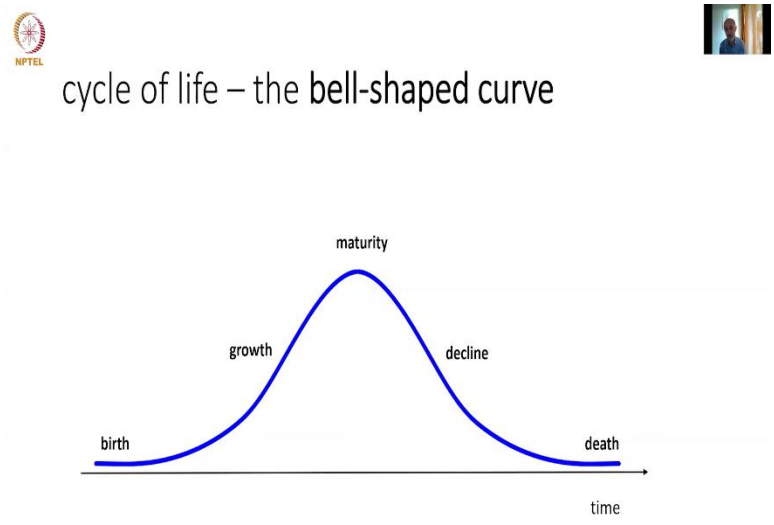

How, in a time, things changing and the very basic and very generic concept that everything which has a birth, pass through the stage of growth, maturity, decline and death. Whatever we can observe, whatever we can see, perceive and discuss, always pass through this cycle. We are talking about artifacts, we are talking about ideas, we are talking about regulations, they all pass from this cycle which can be depicted with this bell-shaped curve.

On the horizontal dimension, we have a time dimension. For different system, this time is different. And this is, that is why, when we forecast, in fact, we need to forecast when and where our technology will pass through each phase of its evolution.

The lifecycle or cycle of the life of any technology, let us use this simple but very powerful model in order to discuss about lifecycle in order to better understand how can we predict the lifecycle and how can we get knowledge at which stage we are. Because, if we know at which stage we are, with our system, we can know what is necessary to do next, from a tactical point of view, from a operational point of view and of course from strategic point of view which is a matter of our discussion.

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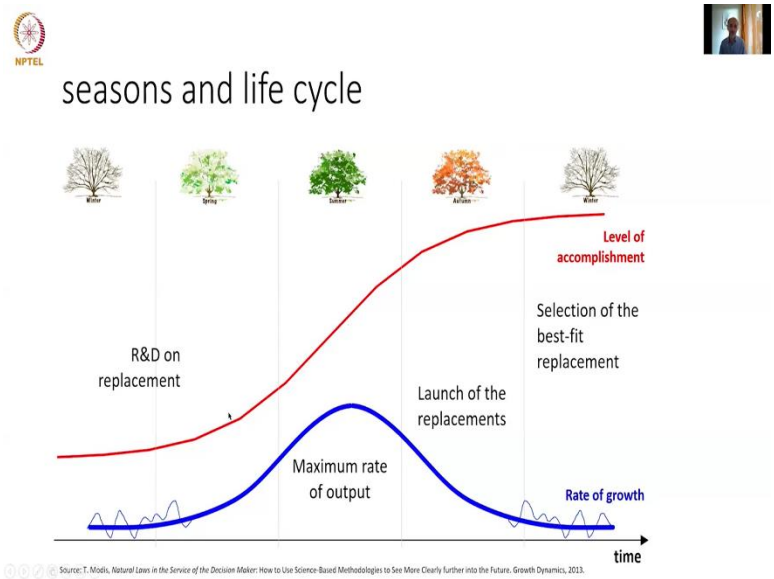

But this bell-shaped curve can be enriched if will use a concept which is a S-shaped curve, which represent the level of accomplishment. The bell-shaped curve shows us the rate of the changes, for instance, how many bicycles per month was produced or how many bicycles per year was

produced or what is the rate we are witnessing now, very specific situation with the pandemic, and what, how many cases per day, new cases per day we have.

But the S-curve which is on this slide is the red one, the level of accomplishment, this is a cumulative number, cumulative number. For instance, if we are talking about new cases per day, the S-curve will describe the cumulative number of the cases, if you are talking about covid pandemic, situation for different countries.

But let us, in order to better understand the lifecycle, let us use a metaphor of seasons. And if we just use the metaphor of four seasons, like winter, spring, summer and autumn, we can see that through this lifecycle, any technology pass through four seasons. At the birth, we have very little potential of the system, after that it starts to grow and the level of accomplishment start to grow in a spring.

And in a summer, we arrive to the maturity of the system which on the level of the S-curve, this is the mid-term of growth. Later in our course, we will look through the logistic S-curve more in detail and we will use it for quantitative study of life-cycle of technology. Now, let us also understand from qualitative point of view, what happens.

In the autumn, our systems stop to grow exponentially and arrive to the plateau, when in the next winter, our system does not grow anymore as it was in the growth period. And the level of accomplishment almost not changing. We arrive to the upper limit of limit of the growth of a particular system or particular technology.

What is interesting to see from strategic point of view, we are doing different things on different stage of evolution, because the transition from the winter to spring, this is a time for research and development and replacement. The new system replaces old one, for instance, today we are listening more and more music by streaming, by downloading and less and less on the CD ROM. This is exactly what happened years ago; the CD ROM were replaced by new technology, with new skills and with new regulations.

Now a day’s technology, different markets are growing very fast. And this is a time of maximum rate of output. This is a time when we benefit from the, our technology most, we have a most rate

of product, productivity, we have a most rate of efficiency. And when we arrive to the autumn, we start to think about what will be the next system to replace.

And when we are at, to the winter, this is a time of selection of the best-fit for the replacement. In fact, when we make technology forecasting, which has most demand, especially when company which is business or technology arrive to the autumn, usually their decision makers start to be interested about strategic technology forecasting because they need to launch a replacement. And we need to prepare everything for our selection, in order to restore this cycle.

On this slide, it is presented like, from the beginning to the end but in fact, you can see this is a cycle. This is a cycle like cycle of the seasons. Okay, the new system will start to grow and this wavy curve just show that at the end and at the beginning of the evolution of any technology due to the competition, we have a kind of wavy curve, not so straight. When within an exponential growth, using S-curve is a, within a time of growth, maturity and start to decline. The line of evolution of our technology can be expressed pretty clear as a line.