Technology forecasting for strategic decision making - An Introduction
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Technology Lifecycle - Seasons, Clockspeed - Part 3

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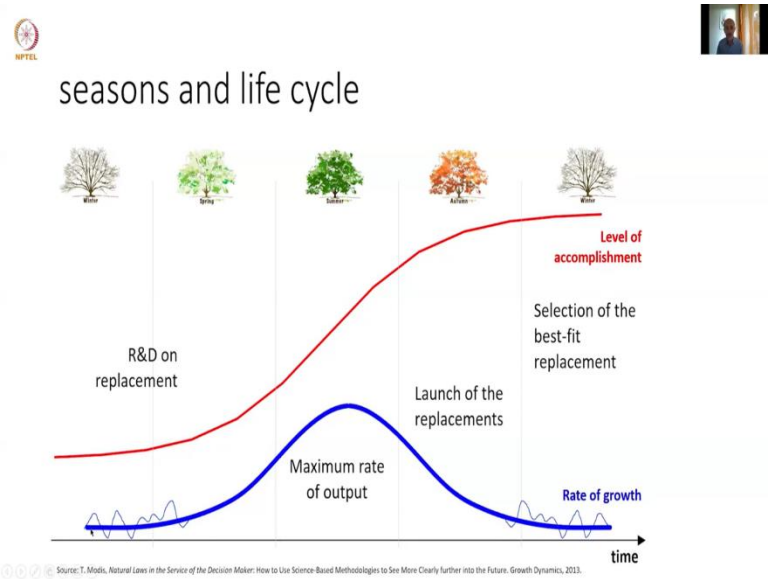

Now, I would like to just add some quantitative dimension about this time. What is the length of this time? For different technology, the length of this time is different.

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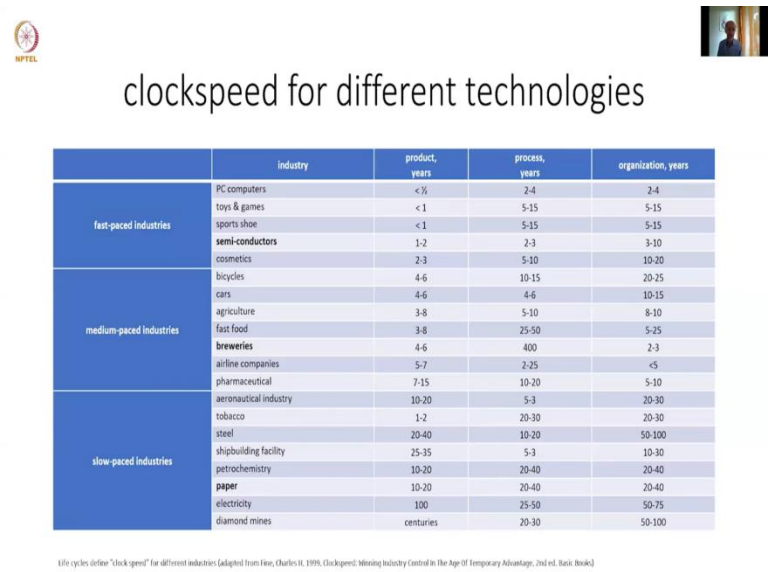

	industry	product, years	process, years	organization, years
fast-paced industries	PC computers	< ½	2-4	2-4
	toys & games	< 1	5-15	5-15
	sports shoe	< 1	5-15	5-15
	semi-conductors	1-2	2-3	3-10
	cosmetics	2-3	5-10	10-20
medium-paced industries	bicycles	4-6	10-15	20-25
	cars	4-6	4-6	10-15
	agriculture	3-8	5-10	8-10
	fast food	3-8	25-50	5-25
	breweries	4-6	400	2-3
	airline companies	5-7	2-25	<5
	pharmaceutical	7-15	10-20	5-10
slow-paced industries	aeronautical industry	10-20	5-3	20-30
	tobacco	1-2	20-30	20-30
	steel	20-40	10-20	50-100
	shipbuilding facility	25-35	5-3	10-30
	petrochemistry	10-20	20-40	20-40
	paper	10-20	20-40	20-40
	electricity	100	25-50	50-75
	diamond mines	centuries	20-30	50-100

Life cycles define "clock speed" for different industries (adapted from Fine, Charles H. 1999. Clockspeed: Winning Industry Control in The Age Of Temporary Advantage. 2nd ed. Basic Books)

And if you look through the research in this domain, it was suggested there are special term ‘Clock Speed’ for different technologies. There are several publications from, from Fine Charles, several studies, when he analyzed the history of evolution and history of replacement. And we can see that all kind of technologies or in original publication, they were named industry, we can split them by fast-paced industries, medium-paced industries and slow-paced industries.

What does it mean? For instance, we take the semi-conductor. The products and technologies in semi-conductor industry, they are replaced regularly with a piece 1-2 years. Okay, it means every 12-24 months, we have a new hardware, we have a new artifact. When the process to produce this hardware are not, are replaced not so fast, they are replaced with a piece, somehow 2 to 3 years. When the organization behind, they appear and disappear with a rhythm 3 to 10 years.

It means, if we are looking at strategic decision in semi-conductors, we have to have a bold idea about particular market, at least for 2 to 5 years. If we, for instance, took another industry, like brewery, this is a beverage, a particular beverage, very particular one, this is one of the oldest beverages publicly accepted in our civilization.

Okay, we can see that new product appear every 4 to 6 years where the process has not been changed since long time. Okay, when the new small companies which start to produce new product, usually appear 2 to 3 years. Yes, there are some brands which exist quite long time but they are not so numerous. We are looking now for their situation in industry. And every 2 to 3 years, we can see that new organization appear.

So, if we would like to take decision, strategic decision about the product, the new product in this industry, we have to be capable to predict for the time horizon at least for 6 years, what will be demand change and what will be the particular characteristic of our future technology. What kind of skills we will need to produce, what kind of regulation we need to follow, how regulation will change and so on and so that. Because the stronger beer, it can be banned for some countries, for certain reason.

And, slow-paced industries, when the time of replacement of the product is much longer than for the fast industries. For instance, for the paper, we have a new kind of product every 10 to 20 years. Okay, this speed was increased particularly when we start to print our digital pictures on

the special paper, but we can see now that it comes back and we do not have new product really, okay, new product on the market faster than within 10 years.

When the process to produce paper takes, to substitute one process by another one is bit longer and when new companies appear for producing paper, this is the case. How it is useful for our purpose of strategic forecasting? In fact, for strategic forecasting, when we pose the question, we need to ask - do you remember for us technology forecasting, this is answering the question - what, when and where.

So, 'when' depict the time horizon. So, if for instance, I would like to predict the future of music recording technologies, first I need to identify my music recording technologies, they are in which industry; in fast-paced industry, medium-paced industry and slow. And after that, I can have some ideas, what will be the reasonable time horizon in which I have to answer my question.

Because if the time horizon is very short, for instance, I would like to predict the future of the cars, but I say in 2 or 3 years, okay, in 3 years usually in car industry, there are no changes. So, this will be prediction more on the tactical level or on the operational level, but not on strategic level.

So, if I come back to my example about recording music, I have to choose the right time horizon, what I would like to predict and where, because on different market, the time of replacement can be different. So, that is why, on this table, you can see always the range, not only one figure because in different condition, the replacement for the time of process, replacement of the organization level or on the regulation level is different.

This was what I would like to share with you just as introduction about lifecycle of technologies and clock speed for different technologies.