Technology forecasting for strategic decision making - An Introduction

Professor Bala Ramadurai
Indian Institute of Technology, Madras
Professor Dmitry Kucharavy
EM Strasbourg Business School

Technology Lifecycle - Example case study - Transportation

Oh, hello there, welcome to technology forecasting for strategic decision making. This is yet another module. This module is going to be on technology evolution cycle, okay. Now, if you are wondering what is a professor doing with toys, in front of him, you will get the answer soon. I watched, a few days ago I watched my son play with this and sort of, I thought he outgrew this and then, an idea occurred to me.

I said, wow look at this, this is just a set of wheels and some repeating blocks. You give it to a child, show it to a child and immediately in a flash they will identify this as a train, right? We take these things for granted, you just hop on a train, get off wherever you have to get off, not really, you know, focus on what this is all about, what is this train, what is the history, nothing like that, so you just take it for granted.

And then, I started thinking about this and I said, an idea occurred to me. Technology evolution cycle is something that I am going to cover in this module, what do I do? So, then I asked my son, may I use your toys for this, recording this course? And he said, yeh papa go ahead, no problem, thank you so much. I said thanks, this is great, let me see what I can do.

So, if you look at it, the most prominent feature in all these toys are the wheels. Again, another thing we take for granted are these wheels. So, if you took trains for granted, wheels are definitely not in that picture, right? So, wheels are something that we take for granted. So, I am going to look at transportation itself as something that has evolved over aeons, right. So, I am going to start with the wheel.

Nobody even knows when the wheel was invented, who invented it, where was it invented; very sketchy. Sketchy, people say this place that place, this person that person and they really do not have a clue; they are just giving guesses here, but must have made a significant impact on transportation itself when the wheel was invented. And the idea probably spread across and people had wheels for everything.

So, they must have started off with something, building something like this, like a cart, this is made of LEGO bricks, this is cart with some wheels, okay. They must have domesticated animals, so they would have hitched on the front and they would have gone and they would have carried the luggage and whatever stuff and themselves and probably their relatives, some other little animals, they would have transported it all across.

So, they could take goods from one place to another without effort from the human being; the animals were doing the work. So, this is probably where they started, this is the evolution of transportation in, on the surface. Now, there is another medium also where transportation was evolving, that is water, correct, you guessed it right, water.

So, they must have started with what - a log of wood and rowing with pieces of wood? Okay, that is probably what they tried out first so they can go across, take little things across lakes, oceans, rivers, so they probably did that. Then, they must have carved little canoe, a kayak, a boat and probably a ship.

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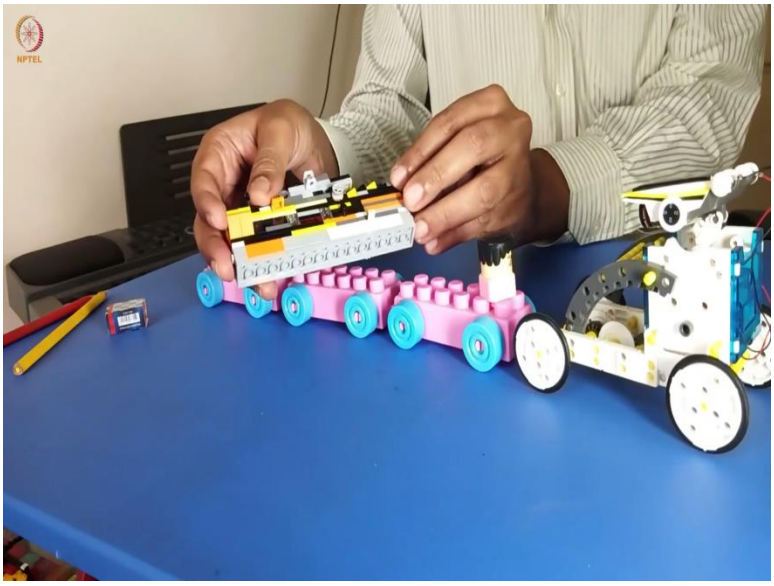

So, let us assume for a moment that this LEGO piece is a ship, where it has an exhaust and everything. So, that was probably what they built, ships to transport people, warships even. And royalty travelled on ships if they want to go long distance. Then they attached sails to it, so that wind could be used to propel a ship, so all sorts of evolution and amazing things happened.

Even now ships are used to transport heavy stuff across continents, even people, luxury cruises, cruise ships are famous for carrying lots and lots of people at one go, it is like a floating city almost. It is used in military applications where you have aircraft carriers and all that. So, that is something that, it went on in the shipping industry or the, so that is forked out.

This is the land based, sort of, transport and here we have, you know, let me keep it here, water-based transport. So, in land based itself, so this we did not stop here, right? Humanity did not stop here, we actually moved to mechanizing transport.

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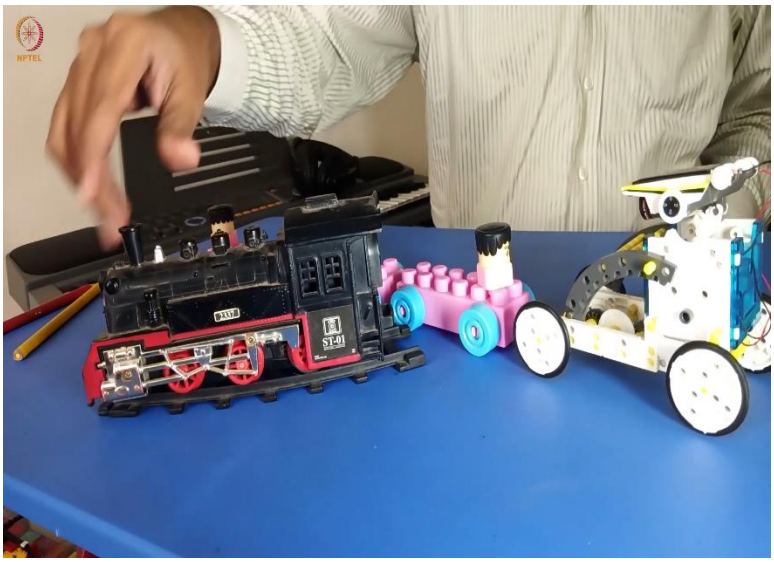

So, in mechanizing it, one of the first few things that we saw was the invention of something like this. This is called, this is a train of course, with the first example that I started off with. The invention of the steam engine, the steam engine, solid fuel was used in the form of coal and it powered the vehicle on tracks. They built tracks and on top of it...

So, I will, if not so far from a historic place when it comes to railways, I live in Pune and Mumbai is not so far off from here, Bombay to Thane was the first train journey carried out in India in 1853, 3 coaches carried people all across. So, this is used for carrying people and goods and it was carried on track. And this evolved, if I set, move this aside, this also evolved when solid fuel moved to liquid fuel.

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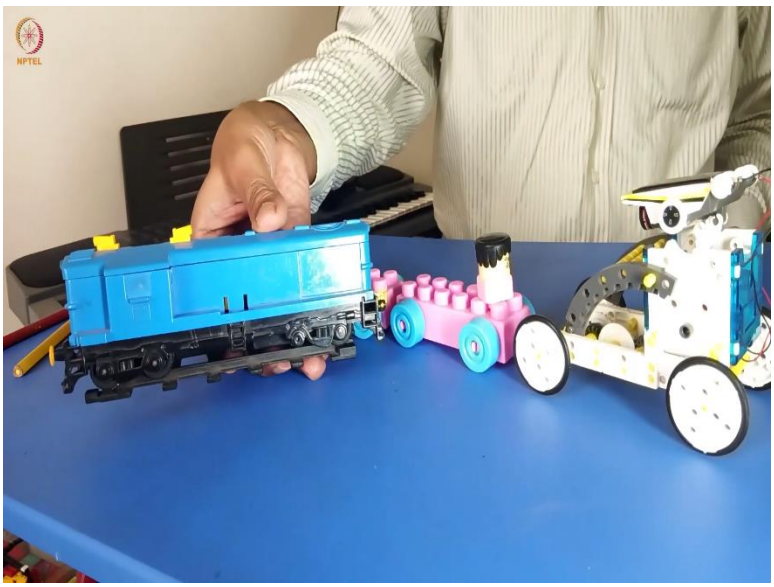

So, this is the diesel engine, diesel locomotive which is the next step of evolution in this form of transport. So, and we started using liquid fuel. Of course, liquid fuel had to be converted into electric power and that moved the vehicle forward. So, now we have totally electric locomotives which push the or pull the vehicle, pull the train on railway tracks. So, this is a railway track, mechanization, mechanized transport also happened on the surface.

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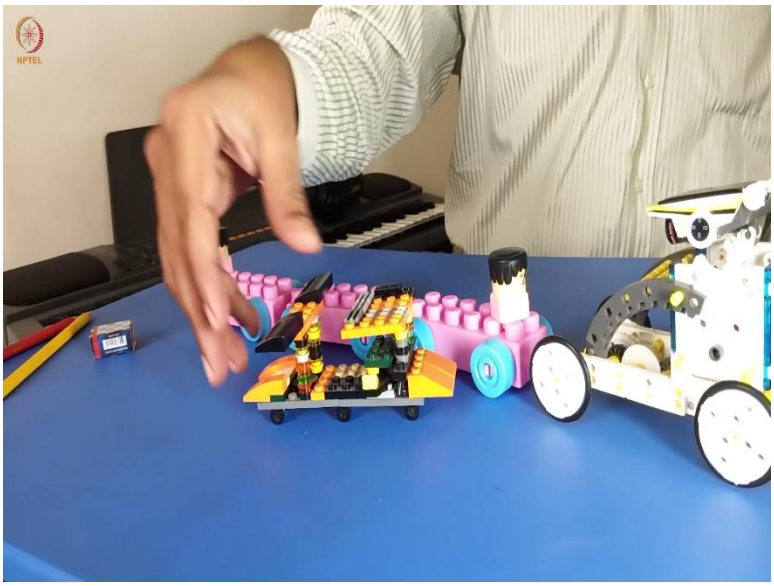

And that was, let us assume for a moment, that this is a car with an internal combustion engine, so, similar to what we have in a locomotive but much smaller, you converted the liquid fuel, the power was converted into mechanical energy.

So, mechanical energy, this could move all across. The surface transport was in the form of cars and that was the mechanized transport. Mechanized transport again, this evolved further and it resembled something that we have with modern cars.

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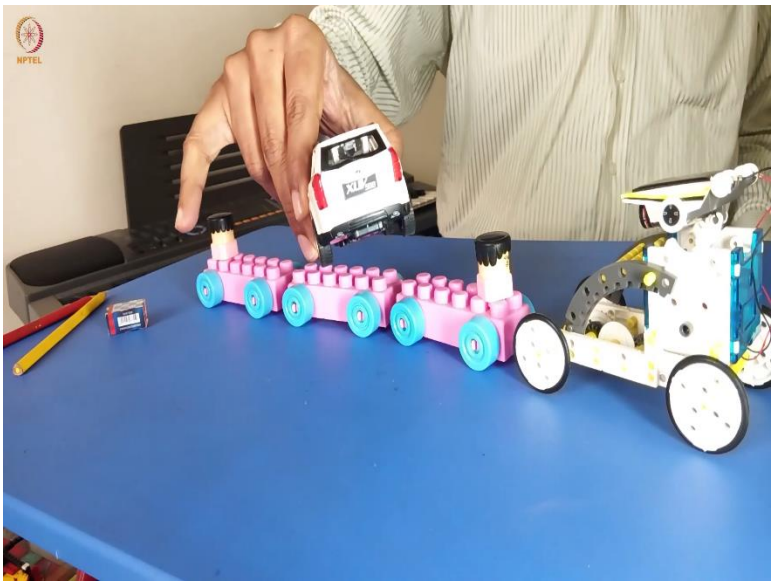

This is a sport utility vehicle manufactured by Mahindra. In India this is a model called XUV 500, one of the sport utility vehicles. So, this is the evolution of surface-based transport, mechanized surface-based transport. Now, we are done with waterways, rail-based vehicles, we also looked at surface-based vehicles. There is one more medium on the planet which is air based.

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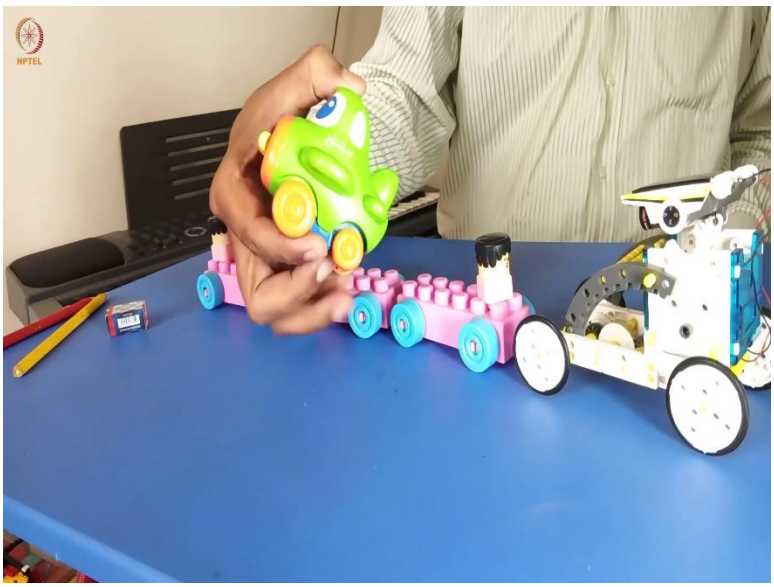

So, they have, Wright brothers made their first powered, mechanized power flight in 1905 and that was, this is a cute representation of an airplane, propeller-based airplane and that was the first mechanized plane, right. So, that was the first generation of airplanes and they flew it. After that, it evolved with the evolution of, or this invention of jet engines.

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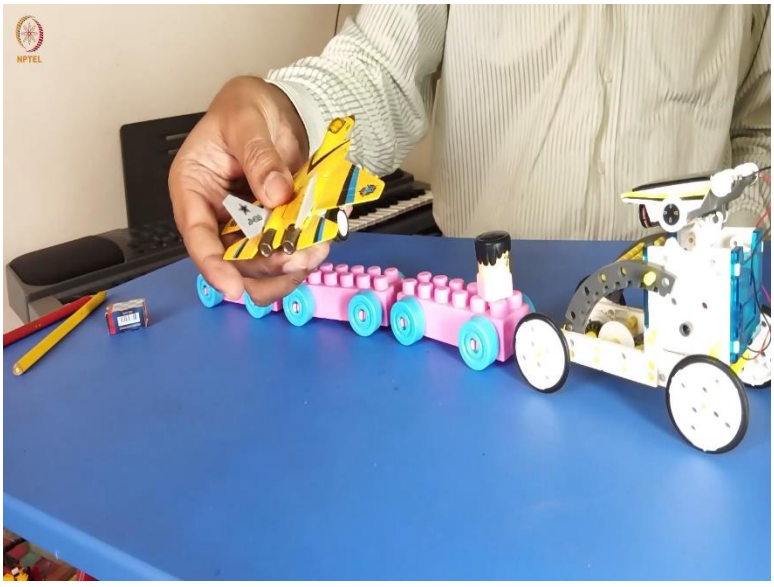

And that brought in the next set of evolutions in the aircraft engines and, aircraft industry itself which is the jet powered aviation, sorry airplanes, I am sorry. So, this is a fighter plane with twin engines, you can see two engines here and that is how it evolved. And also, in commercial, people started travelling, you could travel around the world in less than a day, it is that fast.

So, it is very fast, very efficient and could a haul a lot of people at the same time across continents, when earlier we were talking between cities, these guys could do between cities. Then we moved to a across countries and now we are talking trans-continental. So, things evolved further. Now, all this, these modes of transport are still on planet earth. What if we move to another planet?

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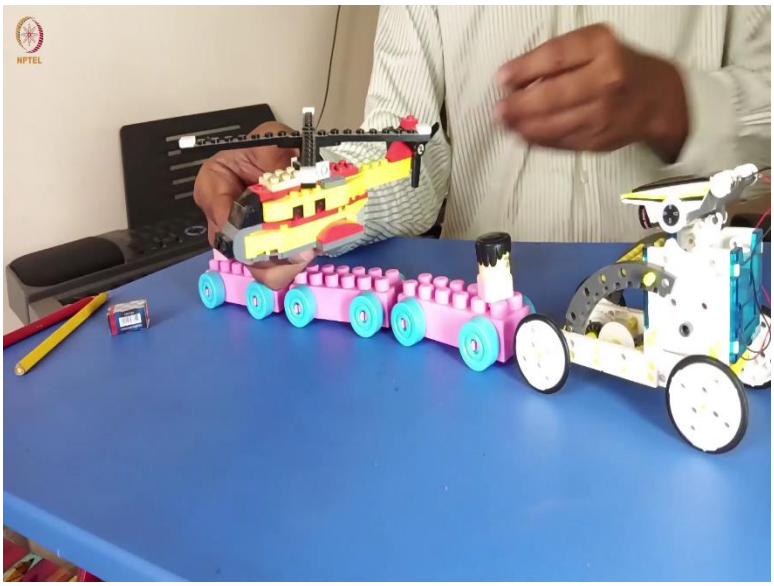

So, you will, oh I am sorry, one more form of transport which is, if you needed to, so jet engines could go fast but if you needed to stop and help somebody here in a search and rescue operation, you had helicopter, okay, there you go, I can rotate this. This is fun. So, the helicopter actually, I could even have a tail rotor. So, it could actually help you with search and rescue, it could hover at one place and help you that way.

Or you could do short distance transportation of people or goods or you can also use it for military operations where the jet planes, fighter planes cannot go, these guys can go into forests and do the tactical operations there. So, that is, oh wow I have a crowded place here. Okay,

somewhere I found place. Okay, now, this is all in our, on our planet. What about when we start colonizing other planets?

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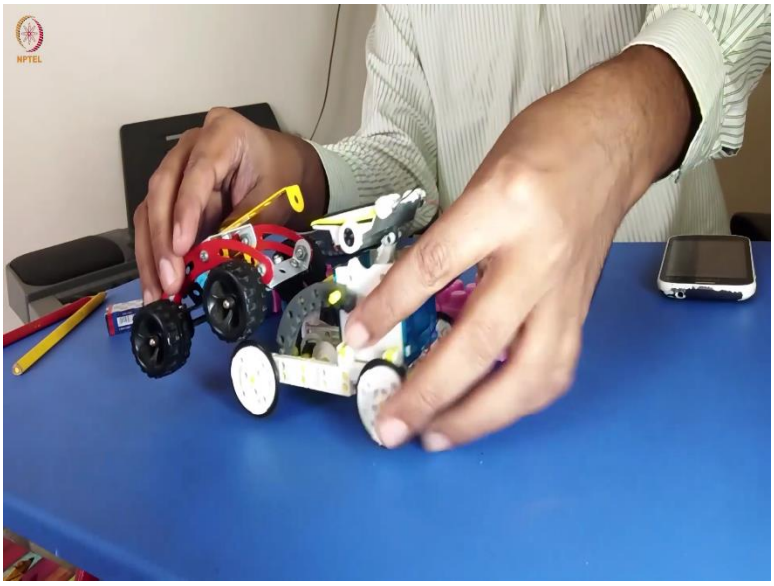

So, this is my representation of a buggy, a lunar buggy or even a Martian buggy, right. So, these are vehicles, rovers which can move on other planets and but we need fuel right? I was talking about solid fuel, liquid fuel. You cannot take that fuel all across. So, but we can take something like, what I have, is here, this is a solar panel. You can take these solar panels to another planet and run this vehicle. So, that way these vehicles are handy, you can use them and of course, you need to get to the planets.

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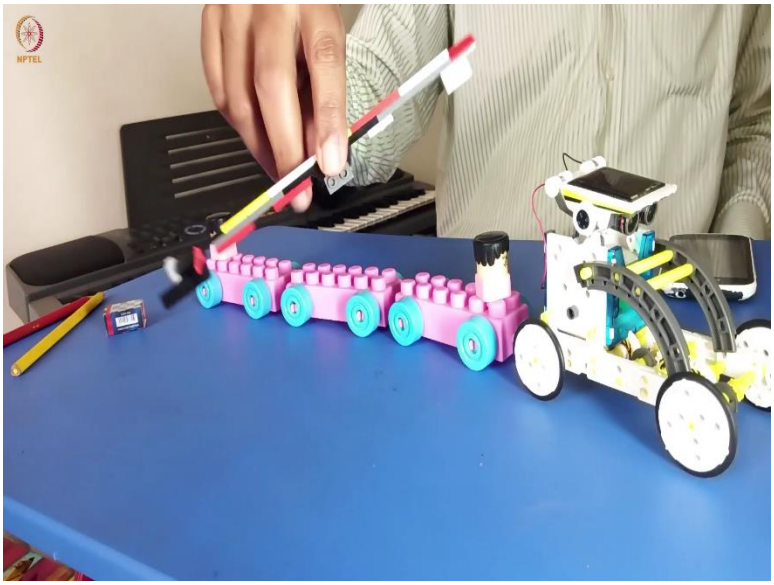

And this is our representation of a fancy looking station which can be used for your living. You could live inside this with attached modules like the International Space Station, you can live there. You can probably hook it up to a train, go up there, drop the train, the train will do the surface transport, this guy can take you to other planets.

So, this in short, is my, I have used all resources from my home, my son was kind enough to give me this, loan me this, I should return it back to him. So, you can see that you can have an evolution of a technology based on stuff that is lying around at your home. So, I would urge you, encourage you to find some piece of technology in your home, in musical instrument, electronics, I don't know, just find something that is lying around and look, dig into the history of that piece of technology and see where, how it evolved, how did it gradually evolve into the shape that you find it today.

And then, be brave, try to make some predictions into the future, what it could look like and post it on our discussion forum, our course discussion forum, we will be happy to look at what all example you can come up with. So, use objects that are lying around and construct, build your evolution cycle.

So, this is probably your exercise that you can do, to exercise, not only your creativity but also find out about history of the evolution cycle itself, you can do it yourself. Okay? So, we will be

waiting for what you have to say, we are very eager to do that, okay. So, thank you very much for listening, see you in the next module then. Bye for now.