

INTELLECTUAL PROPERTY PORTFOLIO MANAGEMENT

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Welcome friends. So in our earlier videos we discussed about various strategies related to our IP portfolio management with respect to different types of assets which we have in our portfolio. We also discuss that how we improve our positioning using this IP portfolio assets. For that we discuss the role of SWOT strength, weakness, opportunity, threat analysis using internal factors, external factors, but

one very fundamental question is there, that from where those IP assets are coming in my IP portfolio, how that IP portfolio is being developed over a period of time. And for that purpose, we need to go to the basics of innovation, that we need to create a culture of innovation, we need to create a culture of intellectual property development in my organization. And only when people will think innovatively, new ideas will come, new opportunities are identified, new problems are identified, what market is requiring, what customers are requiring, then only innovations will happen. And therefore, in this particular session, we are going to discuss the generations of innovation.

And when we are going to discuss generations of innovation, we will discuss this generations of innovation at two level. One is more from the conceptual point of view that over a period of time last let us say 50-60 years from where we have this definite term known as innovation. So, how over a period of time what type of changes are coming in our understanding of innovation or how organizations are doing innovation that is one thing and second thing what are the sources of doing innovation in the organization. So, these are the two labels at which we are going to discuss in this particular session.

So, first let us understand because these two terms are very confusing invention or innovation. Innovation means that there is a scope of commercialization. So, when you

do research that is invention And when your research is commercialized, it becomes innovation. That is the simplest way to differentiate between invention or innovation.

And it is important that we should not use these two terms interchangeably. Many a times it is possible that people in their normal discussions they may say inventions and innovations similar to each other. But it is not the case in invention as a academic person I say that it is more related to generation of new ideas which are actually challenging the scientific growth, technical challenges etc. But here the commercial angle is not there. in this case commercial market making products from these inventions that aspect is not there.

When your research when your new ideas are converted into products which may go to the market that is commercialization and then it becomes innovation. So, scientific studies in the lab may not be invention And when you are converting that into product that is innovation and that precisely is the difference between engineering and technology also. When you are working in the lab you are developing new principles that is engineering. But when you are converting that knowledge of engineering into wealth creation that becomes technology.

So, technology is closer to innovation and engineering is closer to invention. Now, innovation therefore, since innovation when you are making money out of that it must have the external understanding, it involves interaction with the customers, it involves interaction with the market and their feedback also. So, that is also a very important part of innovation because if you are developing a product, you are developing a solution which may not be fulfilling the expectations of the customers, customer will not be interested in your products.

So, therefore, interaction with the customers or the feedback from the target market These are integral part of your innovation activities and therefore you can now understand very easily that all innovations are coming because of invention that is one part but all inventions may not get for commercial success. very few inventions may actually go to the market and become successful. So, it requires huge amount of efforts in translating your research into commercial success. And here comes the role of people coming from the management background.

Those who are doing inventions, they are scientists, they are engineers, they are researchers. But there is a gap science and this is the market. So, the people who understand some part of technology, some part of market, they are able to bridge this gap

and here comes the role of these innovators or the students of management disciplines. Now, another important thing when we have understood this invention versus innovation in this session, what are the different ways through which you can classify innovations?

the object of innovation where you are doing innovation that object whether you are doing innovations in the product goods services you are continuously making new types of iPhones. Samsung is releasing around 200 new type of mobile phones every year that is the rate at which Samsung is doing innovation in the product. iPhone is also being launched may be every year or every alternate year that is the kind of innovation Apple is doing. So, these are the examples of product related innovation.

Method of production, business processes, marketing innovations, technological innovations, these are the innovations which are happening in the processes. How you are making your processes more environmental friendly, more energy friendly, less toxic emissions from your processes. These are some of the examples where lot of innovations are happening at these days. So, all these are the object of innovation whether it is in the product or it is in the process.

These are the two broad categories product versus process. The size of the innovation radical innovation which can totally change the way we are moving. So, after every few years some radical innovations happen And then once a radical innovation happens, then for some time there will be incremental innovation. You are doing radical innovation, you are moving like this, this is incremental innovation.

And then there will be a quantum jump and then another wave of innovation will start. So, this is radical and this is incremental so you do radical incremental radical incremental these type of so when you are creating radical innovations it is the size the impact of that innovation is really really very large disruptive innovations sometime it is disruptive innovations also which is very similar to radical also that changes the entire industry direction so like in many cases our mobile phones is an example of disruptive innovations which totally disrupted our landline communication systems and it is now most of the places we are totally dependent only on the mobile communication system. So, that is an example of disruptive innovations.

So, disruptive innovations must be the biggest in the size then the radical innovation and then the incremental innovations. Place of innovation whether it is happening within your organization, closed innovation, whether outsiders are also involved in your innovation process that is open innovation where you have stakeholder involvement also. So, where

place is a limitation, where place is not a limitation, these are also one way of understanding the type of innovation. So all these things are becoming very very important in present day context where innovation drives your competitiveness.

Now there are so many research papers, so much of content available about history of innovation also. that how over a period of time different types of innovations what were the driving factor of those innovations at that time are available. So, we are going to discuss for next few minutes these generations of innovations and their specific characteristics. So, researchers have agreed that we can divide the six generations of our innovation journey so far. And first generation, second, third, fourth, fifth generations these are available in this chart.

Here you see that the period of these generations though different researchers they have given or coined different terminologies for that. But more or less meaning is same. First generation is from 1950s to mid 1960s. Second generation is from mid 60s to early 70s. then from 70s to 80s the third generation, 80s to 90s is the fourth generation and almost at the end of the 20th century this fifth generation and now in the 21st, now in the

21st century we are going through this sixth generation of innovation models. So, as I just mentioned that different authors have given different types of names to these generations and most of these generations are coming for a period of 10 years, 1 decade and decade to decade the concept is changing. So, let us start with the first generation. The first generation of this innovation model which is more or less linear kind of model.

The world was too much in trouble before this because of two world wars. So, this was the post second world war phenomena where people started thinking that we are done with the wars. Now let us see what is the way of growth, what is the way of progress, what is the way of peace to live in harmony etc. And at this time people thought of developing new products for betterment of humankind. And in this case science became the driving force of innovation.

Whatever scientific inventions were happening, because of the basic science development these were converted into products into the various kind of innovative activities. So, it was actually we know the science and we were converting the knowledge of science into the products. So, it is a conversion of pure science into the products now in this particular phase we thought that it is a linear process.

The diagram itself shows that from basic science we move to design then manufacturing and then marketing and sales. So, that direction was completely this way it was pushing. So, whatever science we know we were pushing the products based on that scientific knowledge. And in this case We were very less concerned about the market needs.

I think that is the biggest drawback if I see from today's point of view. In fact, it is also very interesting to see that when I try to analyze this entire development from my 21st century knowledge, I can easily say that this approach lagged the market connection. but I need to be more realistic the condition of 1945 1950s that what used to be the condition at that time. So, if I see from that perspective I must realize I must congratulate those people that they started thinking on a new direction rather the direction of the war and conflicts they started the process of development through these innovative approaches that okay we have some scientific knowledge which we used for war now let us put that knowledge for the purpose of doing betterment for the society.

One such very good example is knowledge of mathematics optimization. The operations research subject which many of us know that operation research was mostly used during the world war period that how you optimize your resources army resources in the battlefield. After the world war all those mathematicians were free and they started using the same knowledge for the betterment of the business organization. OR is a very integral part of any business management course because now we understand it is more relevant for business than anywhere else.

So, it is somehow a very constructive direction which people or scientist of that time started working on. The second important generation after this push approach the second generation is emphasizing on the market and consumer needs. Now, it is also a relatively linear kind of model as our first generation model, but here we are understanding the need of the market and therefore, this is known as market pull, demand pull, need pull model. That was the technology push

Now, it is pulling that okay market has the requirement and market needs this type of product. So, I will put that type of product to the market. So, here now we have started thinking about the customer about the market and this is a big difference between first generation and second generation. However, after realizing the need of the market We were not involving too much those customers.

We have understood your requirement. Now we are going back to my organization. We will develop a product and we will supply that product to fulfill your need. Whether it is

actually fulfilling that need or not, that was not that much of my concern. Then some of them started thinking, okay, let us take feedback also.

try to improve their product. So, those will be the basis of our next generation of innovation models, but there is a shift from push to pull from generation 1 to generation 2. Now, coming the third generation of model, because we have seen push and pull systems. This third generation of model is actually combining push and pull. It is combining

technology push that is first generation and market pull that is second generation. So, this third generation 3G is 1G plus 2G equation is also mathematically correct. Now, in this case you have needs which are coming from market that is 2G. and new tech which is coming because of your scientific strength is 1G. And then you are using both these approaches for providing products to the marketplace.

So, this is a hybrid kind of model of innovation which came during the period of 1970s onward. So, in fact, it looks more logical that Whatever strength you have, you should use that strength. The basic of this model is whatever strength I have, I have to do my SWOT analysis of my portfolio. After doing the SWOT analysis, whatever strength we have and whatever needs of the market are there, I will identify few needs out of those large number of needs which I can fulfill from my available strength.

For example, let me tell you that at IIT Roorkee, we have so many engineering departments. We are doing research in so many areas. But there are about five different departments in our campus which are only around water. There is a department of water resource management. There is a department of hydrology.

There is a department of alternate hydro resources. Then there is a civil engineering department, there is mechanical engineering department which also takes care of water related activities and there is a centre for dam safety also. So, all these departments are connected with water kind of issues. Now, when we have so much of resources available to water, so much of expertise related to water that may give 1G that we will push technologies related to water. But then we also realize that there is a problem of safe drinking water.

Society needs some solution which can provide safe drinking water. Because of so much of industrialization, lot of pollution is happening in the water. Water tables are getting polluted because of the discharge of chemicals. A lot of research and development, a lot

of good solutions are being developed by our researchers to solve the problem of this water pollution and how to make, how to create some kind of portable solutions for cleaning the water. So, that is a good example of combining the market need and your technology available with you or the strengths available with you.

Then comes fourth generation of innovative models and this fourth generation of the innovative models which is post 1980s. It is basically built on the linear innovation models and not only linear but it has so many feedback loops also. You are moving from this stage to this to this to this. And here as we just saw that there is a technology push also and then this is a market pull also. So, when you are getting driven by both the ends that technology is pushing market is pulling.

So, what type of product will come? Here we need iterative loop. Why iterative loop? Whether I am understanding the market requirements correctly or not. What understanding I have of the market may not be the correct understanding.

So, continuously I am developing the products and I am taking the feedback of the market. This is the and similarly when I am having the technology push I am also giving feedback that what further improvement is needed in my technology base. So, this is a model where at every step there will be feedback loops, smaller feedback loops which will create some kind of testing of my assumptions.

So, you need to create multiple experiments, you need to create multiple experiments in this fourth generation of innovation model where you have assumptions. And through those experiments, you test those assumptions whether I have understood it correctly or not. And with this iterative process, I am moving ahead in my innovation journey. So, the important thing in those of this fourth generation model is that we started working on feedback systems. In first three models, we had more or less linearity.

Only one direction of movement start to end. But now, we are having feedback systems, iterative system at every stage. Now, it becomes slightly more complex therefore, because you have added more feedback loops in this process. So, obviously, it was supported by a lot of use of technology and you need to have more speed in this case. Otherwise, your products will be developed

in infinite amount of time because everywhere feedback system is there and loops are created. So, rather moving ahead you may there may be a chances that you are continuously moving only in loops and loops. So, how that forward movement will

happen and therefore, these models are considered to be more complex models of innovation journey. After that almost During the end of 20th century, almost at the end of the last of 20th century, this fifth generation model which is basically more integration, SIN, this is the term we are using for giving the name of this fifth generation innovation model.

which is basically systems integration and networking model. It looks more like electrical engineering or electronics engineering terminology, but it is basically the networking of your various stakeholders in the innovation journey. So, increased integration within the company's and with external entities like your suppliers, customers and educational institutions, regulators etcetera that is. So, now innovation which was in first and second generation very much limited to the organization even in the third also it was limited to the organization and maximum up to your customer and in fourth generation we started the process of iteration.

Now, in fifth generation we are creating more integrated system where we are inviting not only our suppliers and customers but research institutions and regulators also. And as this is the time of competition also during the last of 20th century most of the world was becoming liberal. things were becoming global because of various kinds of agreements the India even also started its liberalization journey in 1991. So, it was the time when almost at the global level World Trade Organization was facilitating the process of free economies and trade across the countries. we have to improve our competitiveness also.

Products and processes need to come at a faster rate. So, the process of simultaneously doing many things rather completing one loop and then starting another loop and then starting another loop at the next stage, this started a new system that various feedback loops can work in the overlapping manner, in the simultaneous manner so that we can minimize the time of developing new products. So, this again became a very important aspect of this fifth generation. And in this case during this time

IT services were also developing in a significant manner, robust IT systems came into the market, large number of activities were happening in this space. So, that also became a very important enabling point for fifth generation innovation model. And then comes our present day innovation model which somebody can also say as open innovation models, 6th generation innovation models where we are having so many important characteristics of this innovation model. These are all important characteristics that it is a model which is more into collaboration. Now, somebody can say that even in the fifth generation

model also we had collaborations with suppliers, customers, R and D institutions, regulators etcetera.

But here collaboration may go even with your competitors also. So, it is the much bigger kind of collaboration where place has no limitation. Whether your innovation is happening within your organization or outside the organization. So, many innovations may happen in a collaborative way. External inputs are also very important.

External inputs particularly from the customer side. So, when we are talking of this sixth generation terms like co-creation becomes very important where external people your co-creation. competitors and your customers they also give inputs in this kind of innovation model. Lot of knowledge sharing happens, knowledge exchange happens in this model. It is free and there are various types of you can say platforms we are creating where people are sharing their knowledge.

I am giving the name of two very interesting names LIGO and NASA. So, LIGO also has its open innovation platform. So, that open platform lego platform. where customers or anybody can come on that platform and may give some suggestions. So, it becomes a very important source of new ideas for these organizations.

Similarly, NASA also does, many of you must have heard about hackathons etc. these days, whether it may be AICT organizing hackathons, various private business organizations also organizing hackathons etc., That is also an example of open innovation models. You are taking lot of external inputs. You are creating the network through which knowledge sharing is happening.

Inbound and outbound innovations are happening. That is also a very important characteristic of open innovations where you are creating innovations not only in your organization but outside the organization also. It is iterative, which is because of the regular feedback. But agile also, very fast. You cannot take much time.

All these things are helping you to become agile. We need faster rate of innovations. So, this open innovation model facilitates that faster rate of innovations. Ecosystem development. We create a culture of innovation.

We create a culture of IP portfolio management. So, because when you become the part of my developmental activity, so you understand the nitty gritty and then you will appreciate the efforts. So, ecosystem development is also there. Risk reward sharing.

Now, when there are so many collaborators, so much of knowledge sharing, knowledge exchange is happening.

So, whatever so, in this model one very interesting thing happens that risk is also distributed among all the key stakeholders. And therefore, whatever gains are there that gains are also equally need to be distributed. So, risk and reward sharing is another very important characteristic of the open innovation cases. And many of you may be knowing terms like design thinking, etc. So, those things are basically helping us in facilitating the open innovation model.

And those who know design thinking, they also know that these are the customer centric approaches of innovation. customer is in the centre and everything comes around to provide solutions for the problems of the customer. So, these are the important characteristic of this open innovation model. So, with this we understood that what are the different generations of innovations And currently we are living in a period which is more characterized by open innovation models and with this we come to end of this particular video.

Thank you very much.