INNOVATION COUNCIL

Moderated Discussion with Geneva Delegates: Insights from Biomanufacturing Experts

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Webinar Transcript

Featuring Syed Ahmned (TechInvention), Charlie Nemugumoni (AVMI) and Rajinder Suri (DCVMN)

Moderated by Jennifer Brant (Innovation Council)

Jennifer Brant:

Thank you for joining. This is part of a series of informal conversations that Innovation Council in Geneva is organizing to give people the chance to interact with experts who are commercializing new solutions, so in this case we are looking at biologics including vaccines, but not only. Today we have three experts from the sector, based in India and South Africa who are going to tell us a little bit more about their personal experience, their organization and then of course, link that to policies and best practices. I'm going to be asking questions to the speakers today and then as I said you can submit your questions via chat and I'll ask them or we will give you the chance to raise your hand at the end.

First, we have Mr. Syed. He is based in India. He is the CEO of a company called TechInvention that he'll be telling us about. He is also the Chair of the EBPMN, which is the Emerging biopharmaceutical manufacturers network. The first question I have for Syed, is just tell us about your company in a nutshell just to get us started.

Syed Ahmed:

Thanks, Jen, for having me here. One correction, I work in the capacity as Vice President for EBPMN, the Chairman is of course Tiago and the secretary is Patrick. TechInvention is a biotech start up, it has been 7 years since inception. We focus exclusively on infectious diseases. When we say infectious diseases, it's both encompassing humans and animals. We work on the research and development in the arena of diagnostics, vaccines and some very novel biotherapeutics. Focused a lot around zoonotic, communicable and contagious diseases with AMR, (antimicrobial resistance) being one of the focal points. We have been recently

certified as a deep tech pioneer by Hello Tomorrow. We are part of the Bactivac network. While we work extensively with organisations in LMIC, we are also fortunate to work with some of the very prestigious organisations in Europe. For example, we have been the only non-EU company which has an associate membership of the BEAM alliance, which is the Biotech companies in Europe innovating for AMR. We are also members of CACMID, ESCMID, BSAC and so on, so that's where we are.

Jennifer Brant:

Okay, so quick follow-on questions, when you say we work with extensively with LMIC and with European associations, what do you mean? On joint R&D, on manufacturing services?

Syed Ahmed:

A lot of access to information, policies, protocol, guidelines, because whatever we work towards today will have to be aligned to the global protocols which the WHO is talking of, whether it's diagnostics, which is also heavily regulated, vaccines being very highly regulated, followed by novel biologics where there regulations but quite a bit of work to be done because new biological entities are still gaining ground in the LMIC context.

Jennifer Brant:

Okay so that's Techinvention. Flipping over to EBPMN, tell us a little bit more about the mission and especially the membership. Something I'd like to know is that are the members tech transfer recipients, are they innovators, are they a combination? Can you tell us more?

Syed Ahmed:

Yeah, the emerging biopharma manufacturers network is a relatively newer organization. I must mention that it draws inspiration from DCVMN, which is a much older organisation and very much at a mature stage, and I am fortunate enough to share the stage with Mr Suri who represents DCVMN. In EBPMN as of now we have 8

members, 2 from Latin America, 1 from Africa, 3 from India, 1 from China, and 1 from Russia. Most of them are state-owned, however in India all three are private organisations. The mission is enabling access to biopharmaceuticals, which means both biosimilars as well as novel biologics, in LMIC's by enabling local capacity manufacturing.

The network has grown over the last 2-3 years to about 8 members today and going forward we would like to play the role of what DCVMN is playing in vaccines in the arena of biopharmaceuticals for LMIC's. Sorry I just missed responding to the last point. Are the members recipients or innovators? I would say both, a couple of organisation members are primarily recipients, while others are largely recipients as well as innovators.

Jennifer Brant:

Okay, I have one last question just following what you said to understand the organization at is core. Is EBPMN a platform for sharing information among manufacturers, is that a way we can describe it?

Syed Ahmed:

Yes, also enabling collaborative development, accelerating research, sharing of resources, and also working towards eventually playing a role where we could work towards harmonizing regulatory aspects across LMICs in association with some of the global regulatory organisations.

Jennifer Brant:

Okay thanks, so to continue kind of setting the stage, I'd like to turn to Charlie from AVMI. Charlie Nemugumoni, we have here from South Africa. So Charlie, I would like to ask what is your personal background and can you give us a quick overview of AVMI so we can set the stage for a discussion?

Charlie Nemugumoni:

Thanks for inviting me to the conversation today. My background is more a scientific background in the lab. I have been involved in development of a couple of vaccines – I think my last project was group B streptococcus vaccine which was an interesting one as it was meant to be injected into pregnant mothers so that the babies were born with some immunity. I became more involved in tech transfers and then I transitioned because I was pursuing a law qualification, and I was with Biovac at the time. Then I transitioned into being involved in contacts and tech transfers within Biovac. At that time it was when AVMI was starting to pick up. So, my involvement with AVMI was very much from the beginning. As AVMI grew, I held a legal position whereby I ensure compliance which as we proceed with the conversation it will become clearer how this is an advantage and a good position.

Overall my involvement with AVMI was from its inception when they registered AVMI in South Africa and that was a strategic decision taken by the members of the AVMI because Biovac at the time was offering support in terms of the office and personnel, where some of the staff members were aligning their vision with AVMI and were allowed to dedicate time to make AVMI a reality. So, in essence, AVMI has been registered in South Africa and is operating under South Africa laws and the structure of AVMI is that there is a BOD which come from different regions in Africa – that was one of the conditions of the memorandum of incorporating that each term we had to nominate a new board, it should have representations from the various corners of Africa to ensure the interests are well represented in the organisation. The interesting part is the operations, we have divided the operation in four pillars. We have the advocacy which is the main aim of AVMI, which focuses on the advocating of the local vaccine manufacturing. There is a communication arm and we have the funding and financing section. Interestingly as well we have the vaccine and technology which was started as a Covid-19 working group. But as things developed there was a drive not to just focus on Covid but to forecast on the future. So, in these four working groups, that's where our members join. They join a particular group where they have expertise or interests to make sure that the driving of the operation on the AVMI is from its members not only from the board.

Jennifer Brant:

Can I ask a question about the membership just to stop you? Where are your members from? Are they mostly from South Africa or are they from all across Africa, all vaccine manufacturers?

Charlie Nemugumoni:

The members are from all over Africa. We have members from countries which do not have vaccine manufacturing capacity, like Tanzania, Burkina Faso, but because their research is aligned with vaccines and the interests they have in seeing the vaccine manufacturing happening. Over 42% of membership is from North Africa, 5% West Africa, 23% East Africa, 27% Central Africa, 33% South Africa in terms of the membership, so it's very diverse membership that we have in the AVMI.

Jennifer Brant:

Okay thanks, so I have a question for you Charlie but I'm going to wait for a second and ask Mr Rajinder Suri to introduce himself, his background and then the DCVMN, the developing countries vaccine manufacturers network. Which interestingly has its headquarters in Switzerland here next to Geneva, but he is based in India. So Rajinder if I can give you the floor for a second to introduce yourself and DCVMN.

Rajinder Suri:

Thank you very much Jen… Well, I am Rajinder Suri, like Jen said, I am CEO of DCVMN International, and I have been here in the business for a number of years, almost 44 years, out of which 25 years at the top management level on the board of directors of Sanofi Pasteur India and then as CEO of Panacea Biotec. So, to meet these unprecedented challenges posed by Covid-19, I have been actively involved and associated with all major global strategic initiatives with COVAX partners, like WHO, GAVI, CEPI, UNICEF and several other international organisations including the industry associations. Basic objective is to ensure equitable and timely access of vaccines to all the people who need it. I represent the DCVMN on Act-A which is access to COVID accelerator and also, I sit on the GAVI's Vaccine Investment Strategy steeering committee and also a permanent member of CEPI's Joint

Coordination Group for 23-24. Also associated with Africa's PAVM talent development workstream and Regional Vaccine Manufacturing Collaborative as well as WHO's MI4A advisory group on malaria. I was part of COVAX manufacturing and supply chain task force leadership team and also part of G20 health group for representing DCVMN in 2022. I have the pleasure of working very closely with Mr. Syed who is my panelist here today, it is a pleasure to have him here.

As far as my association is concerned, DCVMN is a network of 43 vaccine manufactures, from 15 developing countries representing all 6 WHO regions. I will not give you a chance to ask me what is the diversity of the group. The audience here today may know that pre-covid itself DCVMN was catering to almost 60% of the vaccine needs of UNICEF and PAHO, and probably they may not know that today for Covid-19, developing country vaccine manufacturers have risen to the challenge by innovating, developing, producing and supplying over 60% of the global production of COVID-19 vaccines which totals to 12.8 billion doses. So, out of that ~7.4 billion doses have been supplied by developing countries vaccine manufacturers. So, I think that goes to prove what we have contributed and what we can contribute in the future, should there be a pandemic. I think this is something which is a demonstration of what DCVMN stands for. That we should be there to ensure equitable and timely access of vaccines to billions of people who need vaccines.

Jennifer Brant:

Can I ask a quick follow up question about your platform? So, I asked Syed, is EBPMN a platform for sharing information about protocol and best practices, manufacturing. Does DCVMN also have that kind of role with its members?

Rajinder Suri:

Fortunately, I was also a member of EBPMN. At DCVMN we do everything, we are not only following protocols, we are developing vaccines, we are innovating vaccines, and I must tell you that the first DNA vaccine against COVID-19 has been developed by a member company of DCVMN, first time in the world. Then we are next to only Pfizer, BioNTech and Moderna in terms of developing mRNA vaccines as well. These

are thermolabile vaccines so we have gone a step further to make sure these can be stored at more compliant temperatures. So, we are almost utilizing all the platforms that are available today against COVID, whether these are DNA, RNA, inactivated vaccines, subunit protein vaccines, or viral vector vaccines. So, we are into innovation, development, production and supply, so it's an end to end game that DCVMN is playing.

Jennifer Brant:

Thank you for that. I'd like to go for a second back to Charlie. I wanted to ask coming from the African vaccine manufacturing initiative, what's happening in Africa in the vaccine space, vaccine manufacturing space. I know that the African CDC for example has been pretty vocal in endorsing local manufacturing and really pushing that, can you tell us about a couple initiatives on the continent right now and how you are involved?

Charlie Nemugumoni:

The pandemic has presented a great opportunity to reflect and one of the reflections was that in many countries when there were talks about what to do in the pandemic, the manufacturers were somewhat the last to be engaged or to be contacted. There have been a couple of initiatives now to ensure that if the pandemic is to return, at least all the parties are well aligned and they will be part of the discussions.

About two weeks ago, not long ago the AVMI was given an opportunity to chair a meeting with GAVI, UNICEF and the WHO, which included over 20 manufacturers, which is massive because when we started, AVMI only had 7 manufactures and in the meeting we had two weeks ago there was over 20 manufacturers and AVMI played a role to be the mediator and the enabler for this to happen, with Afrigen as well, being party to this because mRNA became the focal point of the discussions. Interestingly this has given AVMI a louder voice within the space, and within the African space. One of the activities that has come out of this is that we have seen that Afrigen has also provided a collaborative interaction with Biogeneric in Egypt which starts to prove that we are starting to see more collaboration happening in Africa.

The AVMI present growth has made it possible for the African CDC and the EU to identify AVMI to be the enabler or to be a potential partner in technology transfer in IP hub development which will halp Africa as a whole – which is an interesting initiative happening in the continent. Towards the end of the last year we had some engagements with GIZ as well in terms of getting some African manufacturers into some sort of a forum which was to assist in the future pandemic in Africa to get the readiness and to equip them and to make sure that if we are hit again with a pandemic we should be in a position to well respond. In Africa is in a very much a positive trajectory and AVMI is playing a crucial intermediatory role. The legalization of AVMI regarding the way it has been structured. External parties want to be engaged with African manufacturers through AVMI, they do their due diligence on the AVMI organisation and I am proud to say that we are finding ourselves being well structured and well governed so that external partners are finding us as a credible organisation to work with.

Jennifer Brant:

Can I ask you what you mean by external partners engaging with AVMI? Are you helping to organize collaborations, commercial relationships, tech transfers?

Charlie Nemugumoni:

Yes, because AVMI has taken a position whereby for the lack of a better word, it is a facilitator in technology transfers. AVMI won't be holding any IP but it will be linking those with the technology with a particular manufacturer in Africa. For example, during the pandemic we had a US company that had a technology and they wanted to partner with a manufacturer in Africa and for some reason they said they found that talking to AVMI a good route into Africa because AVMI has the ability to reach out to all the manufacturers. And we did indeed reach out to the manufacturers and then the US company presented and those who were interested had the chance to see if that's something they wanted to take.

Jennifer Brant:

Okay so that's interesting. I hadn't planned to talk about IP right now, but I'd like to ask a question and also to Syed and Rajinder. Being in Geneva there has been a lot

of focus politically on IP, the TRIPS Waiver etc. how do your members, how does EBPMN for example, or Techinvention, your own company, engage with the IP system. You mentioned that your members Syed, are both tech transfer recipients and innovators. Can you describe what their engagement with the system is?

Syed Ahmed:

Some of our members are still in the R&D stage so I can be sure that a lot of them will be filing applications through the provisional route and also quite a few applications going through the conventional route which has their own country of origin and the countries of interests wherever the product has potential. There are a couple of members like Mr Suri said, the same company that brought out the world's first DNA vaccine, has also brought out the world's first cocktail MAB against rabies. That is a member of DCVMN and EBPMN. These companies that are working on such breakthrough innovations already have taken the NBE route and they file solid patents not only for the process or for a combination, or for a new route of administration but also have applied for product patents which are at various stages, some prosecution stage, some publication, some also granted. In fact, for a disease like rabies the only two MABs in the world are from LMICs and none from the West.

Having said that, coming to our company, Techinvention, since we have verticals – one is our own research, we filed for more them 15 patents, many through conventional route and a couple of them through the PCT route. But we also work extensively in the arena of licensing in vaccines and biologics. There we work with large WHO qualified manufactures, for regulatory, clinical and IP. That's where we work on FTO extensively because when these companies, like Eubiologics, SK Lifescience, or Bionet, give us their licensed products to take them into various emerging markets, before we get into the regulatory part we have to do an FTO where we look to see if their products are protected in those country or are we infringing on someone else's patent so that the business propositions don't get blocked eventually. So, from that context, the EBPMN members are well placed, they are in a stage of transition, and we in Techinvention are working on both the frameworks, FTOs for our principles and filing patents both by the conventional and PCT route for our own inventions.

Jennifer Brant:

Rajinder, what about your membership? Same story as Syed?

Rajinder Suri:

Let me give you a little bit of a pragmatic approach. What has happened is I represent companies which are coming from different backgrounds, different maturity levels, different level of expertise and understanding. There are companies that look out for IP, so there is a mixed bag. There are different levels of understanding and needs and therefore, some are public companies, some are private companies, some are 100% private companies. Perception about the IP is different. However, having said that I must also tell you that we have been engaged in tech transfers which have been bilateral tech transfers largely and the basic idea is that IP is not something which I can give you in a pen drive and you can go and manufacture vaccines, it is not feasible. What is more critical is the know-how part. I think that is where most people are confused and now at least in the latest discussions, I must say this awareness has started now that it is not only the IP but it is the know-how that is important and critical. It is the hand holding, I have led tech transfers from end to end and I can tell you that at any step you can go wrong. For example, you see that the IP says it has to be stirred, now stirred at what speed, how is it stirred, is it rigorous, is it slow, there are so many small things which can completely topple the tech transfer, completely. They can derail the whole project. I think what is important is the complete understanding of IP and know how and then the maturity of the recipient which is very important which has been ignored while talking about IP transfers to anybody and everybody. So, if you see the success rate during COVID, which companies have succeeded in successful tech transfers. Not only from the donor point of view but from the recipient point of view and you will analyze, except for 1 which is Moderna which is a new company, all other companies have had an established credibility in vaccine production. So that means they have the ability, they had the capability, they have the competence to absorb the technology and then receive the technology and therefore they could reproduce the results in an absolute short span of time compared to what normally for any vaccine to be manufactured.

Jennifer Brant:

Okay but here is a question for you now, building on what you just said, how do you get that capacity? Is it through the hand holding? Where does that capacity come from and what's the process for growing that? The follow-up question is what can be done to accelerate that process?

Rajinder Suri:

As you said, Syed comes from India and I come from India, so I'll give you an Indian example. This is like a large Indian wedding, any tech transfer, you have to have everybody on board and there are steps to the technology, from when you sign the agreement to the last man who really has to execute, there is a complete understanding otherwise the tech transfer will not be successful. Because for example in the mRNA vaccine there are 270 steps involved, so if one step goes wrong, you have got it completely wrong, and that is where the hand holding part is important, that is where the transfer of knowledge, the transfer of documentation, the transfer of expertise is involved. The donor and receiver have to have dialogue exchanging information, supporting them on site, changing the scale from R&D to production to upscaling. At every step you need partnership, collaboration and coordination.

Jennifer Brant:

Thanks that was very clear. So, I have a question for you Charlie. You mentioned that Biovac was one of the early members of AVMI. Biovac is public private, is there some best practice that we can look at in the experience of Biovac through government support or funding. What can we look at there in the public component?

Charlie Nemugumoni:

I think in the earliest type of tech transfer deals that Biovac was engaged in, one of the elements of the deal was that they should be a tech transfer to Biovac to execute a component of the manufacturing. As you know Biovac has taken a backward integration manufacturing strategy, whereby the filling and formulation was done at Biovac but for a deal to happen there must be an element of tech

transfer to happen that was part of the whole deal. The government here in South Africa has put a legislation that we call an IPRA, which is an act which protects IP that is generated from a state funded or if there is any money that was used from the state for any R&D. The position is that the R&D team that comes up with that innovation or that comes up with the product, the default position is that they are the owners of that IP, and whether deals that go into should benefit the company or should benefit the state. This is one of the key pillars which has seen the success of Biovac as the government wants to see the incoming IP to have benefit to the country and some ability to say that the one created if it is going out should create revenue or positiveness within the county. This kind of government intervention and support we have seen in other partners or countries. If you look at Rwanda now – there is a push from the government and there is an element of success emulating from there as there is a government interest and push in seeing the success of vaccine manufacturing.

Jennifer Brant:

So, what I have just heard from you is that you have a commitment of the government to make sure the IP that is coming into the country as part of tech transfers is really benefiting the local knowledge base, capacity base, and in addition publicly funded R&D outcomes are protected and then taken forward and commercialized. So, there is like a two-way commitment.

Okay, I wanted to leave IP for a second and I wanted to ask Syed just a couple of questions, framing questions, about biologics, including vaccine but not only, you mentioned MABs. Again, in Geneva there is a lot of attention on pandemic preparedness and response. Is it really just about PPR or are there other things like AMR? How else should we be looking at the contribution of biologics? Where do you think they will have ab big impact?

Syed Ahmed:

Almost all the epidemics, including the recent pandemics, somewhere have had a zoonotic origin. So that is the reason that people are looking at One Health, not only humans but we also need to protect and treat the animals timely. Of course, one of the previous pitfalls of Covid has been the indiscriminate use of antibiotics, which has created a huge surge in antimicrobial resistance. Not only in humans but

previous mutations have been seen in animals as well now. Second is that when it comes to animals per se, there is a lot of antibiotics going into the animal feed, which is being passed onto the vegetation, through milk and so on, which we consume, and aggravating the situation. Given this context the number 1 topic today in the infectious diseases' health centers is One Health. Incidentally now, G20 presidency is with India, and one of the key aspects is management of the AMR and enabling One Health. Vaccines have played a major role in managing AMR, simply put more use of vaccines, more coverage, less of the propensity and vulnerability of diseases, less of the use of antibiotics. Of course, I would leave that part to Mr Suri who is an expert on vaccines.

When it comes to biologics, biologics have been in use for the management of infectious diseases for over a few decades. The transitions are evident, some of the earliest ones are in the form of immunoglobulins, these are used extensively, started in the West but used across all low-middle income countries. When Covid was at its peak and we didn't have the MAB for what was about to be launched. Some of the middle- and low-income countries, including Argentina and India managed to introduce equine based immunoglobulins which is a biologic which worked well at that point in time. After that, there was a transition to MABs for COVID.

As I speak today biologics are being seen as a major force in the management of AMR and in One Health. If we see the kind of importance this category has gained, these are quite evident in the result. Today we have MABs approved for Ebola, RSV, a respiratory syncytial virus, MAB approved for rabies etc. Sometime ago, MABs were largely focused towards oncology and autoimmune disorders whereas today it is not somany are focused on infectious diseases. Also, while so far the focus has been on viral diseases, we now also have a MAB against a bacteria disease which is for Anthrax for preparedness. There are two MABs in phase 3 for which there are no vaccines yet and these are two dreaded pathogens, called pseudomonas aeruginosa and Staph Aureus. These are advanced clinical stage and likely to get commercialized soon. Of course, not just as anti-viral, or for bacterial infections, even in protozoal infections, MAB are being looked upon. We have a candidate for MAB in phase 1 phase 2 of human for malaria, which means they can also have a role to play in protozal and fungal infections. This I believe would be the order of the day going forward.

Jennifer Brant:

Thank you that was really interesting, to hear also about AMR and One Health, the animal and human health intersection. I did have a couple of questions about the markets, you mentioned the growing importance of biologics for so many diseases. I wanted to shift back to Rajinder and ask you, are we talking about innovation in LMICS and developing countries to solve local challenges? Are these producers in local markets or are they targeting more the global market? Tell me about the commercial incentives here for engaging in this space among your members.

Rajinder Suri:

Wonderful question I must say. The developing country vaccine manufacturers, we have 43, out of that around 20 were involved in COVID-19 vaccine manufacturing and supply. Out of that maybe 6-7 were the large players who were really going out of their countries, not only supplying within the country to help protect populations within their own economies but also outside in terms of tech transfers, so this has happened even in COVID. Several companies have gone through other countries like Sinovac has given technology to Latin America and Indonesia,and now we are working with Africa. You must have seen there is a collaboration already announced in public domain from Serum Institute of India with Aspen in South Africa. We are not limiting the vaccine development and manufacturing or innovation to be only country centric but it will be more regional and more global. As I said earlier, having protected more than 60% of the global population itself is a very clear indicator that we are not going to limit ourselves to only geographic zones but we would be very happy to support shoulder to shoulder with other companies, internationally, AstraZeneca, and J&J are very classical examples of these collaborations that have happened with developing country vaccine manufacturers for example.

And you know, going forward, I would say that we are also looking at various initiatives that the governments are doing, whether it is G7 or G20. For example, like Syed said, in India, G20 is really invigorating various initiatives to ensure that tech transfers can improve the capacity building in various parts of the world. And I must thank the Government of Indonesia for taking the first step in establishing the pandemic fund because the biggest problem we had heard off was the risk funding. I must tell you that it took a long time, for all manufacturers, including Moderna, to

access funding. The funding came much later. The manufacturers had to develop and manufacture vaccines at their own risk. India produced more than 120 million vaccine doses at risk and if this was not approved it would have been a complete loss. This is something that is really important for us to understand. We have to bring governments on board to support and help and move forward in the right direction. We are talking about one World. We need to be going in this direction and building. Governments' cooperation and collaboration and support would be most needed in two ways. The risk funding and manufacturing (scale up and scale out), the second thing is the pandemic treaty. It is now being pursued vigorously. There should be free flow of material and machinery when this kind of public health emergency arises globally. This was one of the major restrictions. Certain governments gave a lot of support to ensure that the technical experts were flown in, in spite of the Covid restrictions. They were brought in the sites to make sure the scaling up was not blocked. We moved out workforce into the factories so the production would not be affected. We are looking at the globe and not just a narrow vision.

Jennifer Brant:

We always hear people complaining about export restrictions on things such as filters, or other equipment, but this is the first time that I hear about the free flow of men and goods, but it's a good point.

Rajinder Suri:

DPA was one of the bottlenecks for sure, at that time, export restriction were also the factors which played a role. But you also need to know the rationale for export restrictions because if your house is on fire, I don't think you will go and douse the fire of your neighbor. What is important is that during this time, we need to reach out globally and we need to make sure there is an equitable distribution of all countermeasures.

Jennifer Brant:

Let me ask you one follow-up question Rajinder, and then I will ask the other panelists for their views. You just talked about supporting government policies for

pandemic prep and availability but I wanted to ask you because you raised this equitable distribution issue. I saw that the DCVMN signed the Berlin Declaration from IFPMA and I felt surprised. What does that mean for your membership? I know part of that is committing to set aside a certain amount of production for priority populations in developing countries in the event of a crisis. Is that a commitment taken by your companies?

Rajinder Suri:

You see, we just talked about One Health and one World, in the last two minutes. But what does that mean? We have to go beyond our boundaries. This means that if there is a good initiative, this must be endorsed by everybody, not because you are IFPMA or DCVMN, but because this is a good initiative. This is a good stance taken by IFPMA that in case of another public health emergency of international order, the manufacturers will provide a certain percentage of vaccines for populations that are marginalized and are not able to access vaccines. This is a very good idea. At the same time, I must tell you, that we are only supplying to all these marginalized populations at DCVMN. So, I am naturally inclined to endorse this and this is a good strategy. During the Covid 19, in 2021, our brothers and sisters in LICs were not having access to vaccine and this was a clear inequity and this is a right step in the right direction to find ways. We really need to take care of our populations who are at risk, who are vulnerable and who cannot afford vaccines through bilateral agreements. That's why we need to come forward and find a way. This is why all our members are in favor of this kind of initiatives.

Jennifer Brant:

Thank you, so I just wanted to go to Charlie. Charlie, what do you think are the kind of government policies that will really support the extension of manufacturing, especially in Africa? You hear a lot of people talking about it in Europe right now as a real priority. What can government do, whether in Europe or in Africa to support that?

Charlie Nemugumoni:

I think that starts in local governments. The local governments themselves need to support the initiatives within their respective countries before they can go to the next countries. Collaboration is a higher governmental level than bilateral agreements because if you look at South Africa, we put two countries which are within South Africa, which is Lesotho and Swaziland, there must be a certain level of arrangement because South Africa is in a better position to assist, then those two countries should be benefitting. This also opens up the issues of equipment during the pandemic. They are not really in a position to setting up their own production facility. This is done by a strategy, that ensures that tech transfer is meaningful between manufacturers. Concerning the mRNA, the flavor of the period now, I just watched a video web by the Biogeneric management team on training at Afrigen. Biogeneric indicated that they still needs to close up the gaps and they wish the government could assist them to close up the gaps from what they learned so when their scientist come in with the technology they will not be struggling with whatever it might be. The government must have some commitment, to ensuring local production.

Jennifer Brant:

That's an interesting thing we hear about countries, where the government is needed to come in and fill the gaps whether its co-financing or building and manufacturing infrastructure or training for people, so that resonates. Syed over to you, last comment, what do you thing governments could be doing, including us in Geneva. Is there anything we could be doing here, the diplomates?

Syed Ahmed:

I can give you an example of what is happening in India, we had a production link incentive scheme that came up and this was primarily for manufacturing companies who could set up end-to-end manufacturing capacity of high priority products. This was for pharmaceuticals but they were inclined towards vaccines and biopharmaceuticals. And then there was a PLI2 which came in from the industry because a large portion of the grants were going to big-pharma so now SME's had come up, and they should be able to apply and get grants. During one of the deliberations with these companies in India, we also recommended incentives for

research. While there are grants in India for research, they are contemplating more grants like research link incentive schemes, knowing there are failures in biologics and the riskis very high. So, they want to support companies and start-ups that want to innovate. I think an interesting point is that in the recent passing, I saw one of Bill Gates' speeches where he outlined an initiative called 'GERM', global epidemic response mobilization, he's talking about a 3000 workforce and the narrative around there was can Covid be the last pandemic? I think it could be interesting for all of us to see because really good work is happening around CEPI, GAVI and so on what Mr Suri was talking about. Since I am quite passionate about one health and AMR. I must tell you that apart from governments, the global organizations, specifically around supporting research in AMR and enabling One Health, some of them being Carb-X are doing some awesome work. Including companies in India who are doing pioneering work, a company called Bugworks just got a grant for ten plus million dollars for developing a novel molecule which could take care of AMR. There are organisations called GardP, the AMR action fund and these are coming up all across. Here what's also interesting is that they support collaborative applications from LICs and MICs, academia, and start-ups, this is enabling more collaborative opportunities and I'm sure we will have more research and more collaboration coming as we step though the next phase.

Jennifer Brant:

Thank you, that's a nice note to finish the discussion, collaboration across many entities, north, south, that was a really nice message about collaboration that came through in all your interventions. So, we are at the hour, I wanted to thank sincerely all our panelist, it was fabulous to have a brief discussion with you this morning and if anybody would like to get in touch directly with you, can we make that connection for some follow-up questions or discussion? I hope everyone has a nice day. Thank you very much.

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