Beyond AI Tools_ Microsoft Discovery and the Future of Pharma R&D 1

0:09
So good day.

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Welcome to another podcast where Microsoft and HCLTech come together to explore the intersection of technology and industry and how this drives measurable, important business outcomes.

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In each episode, we brought together experts to talk about emerging technologies, to talk about innovation, but how that innovation drives changes, changes in the way that we think about technology implementation, changes in the way that we think about the outcomes from technology.

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And in this episode, I'm exploring something that I think it's one of the most exciting developments in science, and that's the emergence of AI, not as a tool for researchers, but as a collaborator with researchers as part of the, the scientific process, the discovery process.

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Across life sciences, organizations are facing incredible pressure of cost of risk and the need to speed up the the time it takes to bring new therapies to market.

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But at the same time, AI agents, advanced computing are creating entirely new ways of actually achieving and solving this problem.

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So joining me today are two experts.

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I'm joined by David Carmona, Vice President of Microsoft Discovery and Quantum at Microsoft, who leads Microsoft efforts in AI powered scientific discovery.

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And Doctor Reena heads life sciences as an industry leader in HCLTech.

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She helps organizations apply these technologies and across real world research and developing environments.

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So David, Doctor Reena thank you and welcome to the podcast.

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Dr Reena : Thank you, thank you for the invitation.

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It's a pleasure to be here.

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Thank you, thank you, Doctor Andy, pleasure being here and thank you for having us here today.

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Look, it's I'm pleased you're both here and I think this is really going to be an interesting conversation.

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So, but scientific discovery has always been constrained by time and cost, and complexity.

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And fordecades now, researchers have applied more and more sophisticated tools.

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But we're entering, I think we're entering this new era

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So David, from Microsoft's perspective, what's changed over the last few years that is that's different from previous technology waves that's enabling AI to change the way that we think about discovery?

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Yeah, where to start, right?

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That that's a, it's a question that we just know, we're going to spend like an hour.

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But I would.

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So instead of going a few years back, I would even say in a few months back, right, because this is going so fast that you blink and the technology has changed.

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There's a significant paradigm change in the last few months in the industry that is dramatically changing the way that we make scientific discovery.

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And it's the same thing that is happening in other disciplines.

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I think the the easiest way to understand is to see what is happening in software development because it was the first one that was impacted by that paradigm shift that that we're seeing in the past months.

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And it's the concept of AI not being augmenting individuals who are performing a cognitive task like solar development or scientific discovery, but really shifting that for being the agent, the one who's performing the core of it with the human guidance steering and providing the judgement on that agent.

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That has changed dramatically the way that we do solar development and it's going to change the way that we make scientific discovery.

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We haven't talked anymore for about four years.

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In the past five years, we've been talking a lot on how many lines of code were developed.

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The the ages, the ages, right?

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Where was the productivity increase on a developer?

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Is it 20, thirty, 50%?

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We don't talk about that anymore because the question now is not about productivity.

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It's really about throughput.

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Is how many times am I multiplying my throughput because the the human is steering a swarm of ages who are performing the actual code development.

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The same thing is happening to scientific discovery and we're going to see more and more how agents are going to work in a guided way, but autonomously across the entire scientific method from observation, hypothesis iteration, testing of those, experimentation of those hypotheses.

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And they're learning on that process in an entire new scientific method that is like market changing and it's going to change the way that we do science in the future.

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So I think the yeah, you, raised just, yeah, so many important points.

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And you're right, we could talk about this for morality.

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It is so fundamental and there's so much convergence of different technologies.

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So Doctor Reena, are you seeing that same?

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And This is why customers, are they feeling this change in reality?

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Sure, Dr. Andy and I align with what David mentioned, but let me also start with what has not changed over the last years and months just to bring the full impact of change into context.

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What has not changed is the need for better medications to customers, to patients in shorter time, better approvals of candidate drugs by regulators with better compliance.

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That definitely has not changed.

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The need or unmet medical needs being serviced by the right kind of medications and finding the right target populations, that has not changed.

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What has changed as David mentioned is the whole AI revolution which is sweeping across the whole entire pharma industry from discovery all the way down to regulations and commercialization.

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That has changed and the way the time taken earlier, it used to take 12 to 14 years to bring a single molecule to life in the form of a marketable product, drug product.

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Today it it the time taken to do the discovery which normally would be around six to seven years has been drastically reduced sometimes even to months or within a few years thanks to the influx of AI AI agents and the whole to autonomous operations which David spoke about.

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Also, this would impact the capital investment which goes into developing and developing a drug product which usually runs from 3 billion upwards up to right up to 11 billion.

7:01
In case of oncology drugs that would you would see a significant reduction in cost and time based on the reusability of all of the autonomous agents which are at work.

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These I feel are the major changes sweeping the pharma and the drug discovery to development cycles today.

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Andy, thanks.

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So what I'm hearing from both of you is that this isn't technology looking for a problem.

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This is a real, real demand.

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I mean, you know, yeah, it's incredibly risky to build new drugs, but at the same time, you know, with an ageing population and the like, we are, you know, we're desperately looking for, for new therapies.

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So it's perfect conditions really for this, this change of the relationship and the change of the way that we think about we're exploring.

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So yeah, we've all experienced copilot, we've all used assistance, but yeah, this feels very, very different.

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So Doctor, again, if we just stay with you for a moment, when you're speaking to researchers, business leaders, how do you explain the difference between maybe the, you know, an AI as a copilot and an AI as part of the research process itself?

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Sure.

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The best way to explain in a very non-intimidating manner to the research scientist as to how AI and the AI agents can really play a role is to simply share that these agents will help you take better and more informed and quicker decisions.

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The decision still is the human in the loop, whereas the ability to take that decision is now manifold improved simply because of the speed of operations and the reliability with which the agents are able to perform the inferencing tasks from the universe of knowledge, which the LLMS bring to the table,

which the semantic ontologies bring to the table, which otherwise were not accessible by individual researchers.

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That is the major fundamental shift in the way AI could be leveraged and must be leveraged for arriving at, you know, answers to a hypothesis or decisions to be taken for the next best experiment or the next best action.

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So I think you made an important distinction or an important point there that, you know, it's not the the human in the loop remains really, really important.

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And it feels that what we're talking about is not David you mentioned earlier.

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It's not augmenting it.

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It's almost all moving tasks.

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The were part of of research off boarding them.

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And I I assume in that and and they'd like to get your your thoughts on this.

10:02
Does this give more?

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Does this allow the scientists to do more, to start exploring more options?

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Yeah, Sorry, sorry.

10:12
Go ahead.

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Yes, absolutely.

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It does help the scientist to do more number of activities within a given time frame as compared to traditional means of trying to design molecules, trying to interpret molecules, trying to design formulations and eventually bringing all of those to the clinical trial phases and beyond.

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So definitely the speed of action is and the reliability given the right kind of AI tools is, is the key take away from all of this new revolution we are seeing.

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Doctor Andy, David, what's your perspective on this?

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I think this is important.

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No, I was, I was going to say that I think that the word is, moving from augmentation to scale.

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I think the the big advantage that that we see with this new paradigm is that we're not talking about augmenting a task, a task that I was doing before.

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I'm talking about new tasks that now I can delegate to agents and then I can supervise.

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That changes dramatically.

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The concept is not about making me only better, is making me scale better.

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And as, you were mentioning before, that allows me to not only accelerate, but to drive multiple directions in parallel, not only in a particular discovery, but across many discoveries that I could help manage now.

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So in a sense, it's like scaling the organization to a level up cuz now I have this new collaborator as part of the loop, which in this case are multiple agents helping it.

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That has implications not only in the time to market, but also in the number of shots that I can do in a, for example, in a given, in a given drug discovery.

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I can consider things like increasing my pipeline of drug discoveries that I'm driving at a given time because suddenly I have new bandwidth that I can use to increase my pipeline.

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But then also not only the shots, but also the shots on target because of the ability, and I'm sure that we'll discuss in way more detail today, but because of the ability of doing in silico predictions of my

proposals, I can help accelerate the, I can increase the search space so I can target a much bigger search space and therefore increasing my, my number of shots on target before I move into, into trials, right?

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Which is, as we know, the Holy Grail in, in pharma is to maximize that so I can get more shots on target.

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And I don't have that 90% drop that that that we will see in trials.

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And I've always seen it and, and so many conversations I've had recently talked about this.

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We saw AI automating some things, making some stuff go away.

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We spoke at the beginning about, you know, augmenting, working together.

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But the real way it becomes really exciting is I think it's when you start activating just as you said, things that just were not possible and that, you know, Holy Grail as it is, say is, you know, that has a profound round shift.

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Look, Microsoft Discovery, the platform I like to, you know, it's generated a huge amount of interest.

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Yeah.

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And I think it's exciting because it's not, it's not just an AI, it's an entire platform for research.

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So David, just, you know, people who might not really know what the discovery platform is.

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Do you want to just talk a little bit about what, what Discovery is and what is it?

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What is it aiming to do?

13:57
Yeah, absolutely.

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So at the end, the first thing that you realize when you try to implement this new paradigm in a, an R & d.

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organization, you realize that this is not a problem of just, you know, using a particular agent for an individual.

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When you have these, these teams, these hybrid teams of scientists and agents, what you really need is a foundational platform that can enable this new way of working across your R&D organization.

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So think of Discovery as that underlying platform that we're creating to enable that hybrid team of scientists and agents working together.

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That includes and that goes across the entire scientific method.

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So there are particular specific components in the platform that will help you or help the team to reason over external and internal scientific literature knowledge to then create hypothesis to then experiment with those hypotheses.

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Both in silico with things like identification of your HPC processes or even specialized A, models that you can use as part of the platform for doing, for example, molecular simulation or whatever other scenario you're targeting.

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Also physical experimentation with web lab automation that is integrated also with this agent so they can get into the automatization of your, physical real life experimentation all the way to the learning.

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So you can then feed that learning, that knowledge that you're creating in the loop again.

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So what you have is a system that is enabling this hybrid organization of teams of agents and scientists all in a platform that can learn over time and that can perform this experimentation and scientific discovery at scale.

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So yeah, I think there's just so much there.

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And I think there's some other things, you know, Yeah, another cost that that whole aspect of the physical connection, the the automation to better go, you know, almost from a I've got an idea and I can sequence it and the lab's done.

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It is, is that is, you know, compared to where I started, you know, you know, my, scientific career a long time ago, that that that just is very different.

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Doctor Reena, after hearing all of that, what's it that excites HCLTech about the discovery platform?

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Why are we so excited about it?

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Sure.

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So 1 is the incredible partnership we have with Microsoft.

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And so that obviously lays the foundation, the bedrock for any future collaboration or any immediate collaboration as well.

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That is 1, The partnership itself is, is quite the foundation.

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The other is the need of the market where Microsoft Discovery has got, as David just mentioned, all of these foundational elements.

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The components including the ability to automate the lab, the discovery of phenomenon which we call as lab in the loop where we are now bringing together the Gen.

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AI models, the AI agentic workflows as well as real wet lab experiments to design the next best experiment.

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Just an example of the power of the Microsoft Discovery platform, which is brought now to the fingertips of researchers.

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You know, where they can now combine those models with actual wet lab experiments where they can actually as the high throughput screening of molecules way beyond what was traditionally being done for HCLTech.

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What it really means is our ability to connect better with, you know, the R&D stakeholders, both IT and business in terms of being able to accelerate molecules for their pipelines, to refurbish the pipe

portfolio, pipeline portfolio, to be able to strategically help organizations to plan, you know, their pipeline activities for the next year, coming years in a manner which is aligned both to market needs as well as to the needs of the patient populations.

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This is now on steroids.

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This is, you know, because of the whole Microsoft discovery enablement of the IT tasks, the decision making because it does have that ontology foundation as well.

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The ability to reason and infer and take action.

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I think is now, you know, in in a much more Fast forward positioning as compared to what was being done very, very traditionally.

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Because AI did exist even 50-60 years ago in the drug discovery space, but it existed as machine learning, the non-generative AI and today with the combination of the traditional reasoning methods.

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But given that boost of, you know, the platform enabled reasoning, I think is 1 important and most important is the ability of the machine, the system to identify hidden relationships, hitherto unknown relationships because of the ontology frameworks and because of the body of knowledge, the universe of knowledge available to scientists today to take the decision.

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Hitherto unknown relationships will come forth and those will enable better, faster decisions, more molecules to be identified, new uses, which is, you know, drug repositioning to be identified going forward for organizations.

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And that is what HCLTech wants to empower its pharma customer base with that, you know, Andy, I think is what is my thought on this topic here.

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Is there doctor, is there anything specific I'm that empowerment, empowerment, you know, is there a specific use case you can talk about that we're that we've been working on?

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Sure, the biggest use case of them all is the Super Cliff.

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And the Super Cliff starts now 2026 all the way down to 2030 where all of majority of the pharma organizations are facing a patent Cliff, loss of exclusivity of molecules.

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And this, I'm speaking specifically from the drug repositioning perspective.

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Of course, there are, you know, the drug discovery aspects as well, the peptide and vaccine design aspects as well.

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But from the drug repositioning, the use case would be how can pharma organizations who've invested into standing up big manufacturing plants actually monetize their investments for a longer period of time with better exclusivity.

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And that is where, you know, the whole Microsoft Discovery HCLTech collaboration really takes it to the next level of empowering to your point, Doctor Andy, the ability to empower our customers to reduce revenue losses in terms of being able to protect IP, protect the investments they've made into manufacturing and formulation services.

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And the ability to continue serving patients in need of the medications which were hit her to, you know, the mainstay of a particular pharma organization.

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The ability to bring generics out in the market for a new indication because at the end of the day, biochemical biophysical mechanisms in the human body essentially have an underlying continuum and an underlying thread.

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And therefore the targets are targets are it's no longer A1 drug, one target concept, it's always one drug, many potential targets.

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And that I think the body of knowledge we are building into both the semantic frameworks as well as into bespoke frameworks for organizations as per their pipelines will really help them discover new uses of their own products.

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Facing loss of exclusivity or many times organizations would love to pursue secondary line of indication even while the primary line is being explored.

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The speed to market, which David spoke about in terms of doing faster experiments, better and more number of experiments, relevant experiments, I think becomes, you know, a big advantage by through this kind of a collaboration.

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Doctor Andy.

23:04
No thanks.

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David, what's your perspective on that?

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There's a there's a yeah, yeah, I I love that that direction.

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There's there's a couple of things that I cannot reinforce enough from what you said.

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One is the the mention that you did on a, what about the previous, you know, IP on, on technologies, on even traditional machine learning or or even I would say traditional classical compute as HPC.

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What is what is happening with that?

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It is, it is critical to understand that this is not a replacement of those, right?

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So what we're talking here is an identic layer that is orchestrating the existing tools that you already have as a pharma company or in any other industry.

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And that's actually what is giving you the differentiation, right?

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So and that expands not only to the technology and models that you already have, but also knowledge.

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We see a dramatic improvement if you include working with a customer, their existing IP and knowledge compared with just going plain LLM, right?

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So you go, you can do that now, right?

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You go to any even from Microsoft, you can go to GitHub Copilot for example, right then and you can actually do science with that.

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But you quickly realize that you are going to lack the competitive advantage of leveraging your

existing knowledge, having an orchestrator that is focused on scientific reasoning, which is very different from things like, you know, knowledge and reasoning or things like gold creation, right?

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That is way more sequential.

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What you really want to have in here is it's an orchestrator that can act 24/7 just like the scientific method in a continuous loop that is exploring a vast 3 of hypothesis.

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So it's not sequential anymore.

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You are suddenly what you have is a team of agents who are going to explore new hypothesis based on external literature connecting the dots, as you said, that is critical.

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So that's something that AI can actually do better than humans in these vast amounts of knowledge and then being able to reason over that, to always be experimenting with us, proving those hypothesis and learning in that loop.

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That is not a sequential thing that is going to be over.

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You have to keep it there.

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And that's why you need, In our case, we call it the Discovery Engine.

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It's a piece of technology that we created just for Microsoft Discovery, which is basically orchestrating all of that.

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It's like an orchestrator for the scientific method and having the ability to leverage the existing assets that you have in your organization is critical use case for that.

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In Microsoft, we actually use a Microsoft Discovery inside Microsoft for a quantum computing R&D.

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So our quantum team is using Microsoft Discovery to do the the R&D of our core quantum computing platform.

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And one of the big learnings that we had is that there was like a night and day difference on bringing to this agent all the knowledge that we have from the more than a decade experimentation data and knowledge that we have in Microsoft.

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It was dramatically different.

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So when you're able to reason not only over external literature, but over your internal, that's where your DNA is, that's where your IP, your value, your differentiation is.

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When you bring those two together is amazing.

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That's where you can really create new breakthroughs on top of where you are and, and, and drive.

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Like for example, our recent announcement on, on the new chip for quantum computing, Majorana 2.

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It was developed using, using this, this paradigm.

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And I mean, we could put years of R&D into just months.

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That's a, that's amazing, Dave, if you're a, you know, if you're a farmer organization and you know, as Doctor Ringer said, you're, you're standing on the edge of that Cliff and you're looking down.

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What's your advice in terms of how, how would you start, you know, engaging?

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What's the role of the partner?

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What's wrong?

27:24
Where, what's the first step that somebody should take?

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Yeah, I, I have to say that for the first step, I tend to talk a little bit more about the end state because it is important to understand what is your end state to then decide what is your, your first one, right.

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And the end state that we should always remember is that this is not, again, this is not something for one breakthrough.

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This is not something that is going to be cool so you can drive a very nice announcement on a POC that was successful.

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This is way deeper than that.

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This is really transforming your R&D organization into a new era and that requires more than the technology.

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So yes, technology, the first thing that is, is the shiny thing, right?

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We all go to the technology, we want to take it and use it for, for Apoc that can drive something that is that is interesting.

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And don't get me wrong, that is important.

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You can use it so you can understand the capabilities of the technologies and that is not going to be your biggest challenge.

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Your biggest challenge is going to be on how to scale that to every person, everything in my organization and how am I going to manage the change of that, not only that technology level, but even a deeper levels like the culture, the team organization, the role definition, so the the governance of all of that, right?

28:48
So those are deeper things that the, the sooner you start driving, the better.

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So what I would say first step, instead of just focus on the technology, just think of an environment where you can start putting to test the scale that you're going to be later.

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So think of what is the thing configuration?

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What is the role configuration?

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How am I going to govern this to make sure that I can scale quality and not only throughput when instead of just one POC, what I have is my entire drug pipeline being redefined with AI.

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It's quite amazing when you think about it, that that's yeah, we've spoken, I mean, we've spoken a lot today about stuff that feels really transformational.

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This is this is very, very different.

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It's not, it's not an incremental step.

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It also feels that we're very much still in the early phases.

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We're still early in, in, in understanding how this really shifts.

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I think, David, what does, what does, what does the discovery platform look maybe like in three or five years time, you know, to try and look into the future, very dangerous, but look into future and being very dangerous, very dangerous.

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So I, I feel technology, technology aside, we can talk about technology and, and in particular 1 area that that I think is going to do like another transformation while we're in the middle of this one, which is quantum computing.

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So let's, let's leave that one on the side for, for one second.

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I think the, the technology has to evolve in a, in a way that can better serve that scale needs, right?

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I think we're seeing a lot of and it happens with every technology, right?

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So we, we are going to see for some time a lot of shiny new objects like a new model, a new agent, a new something, right?

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When, when really where the technology has to evolve more is how I can control, how I can govern, how I can have transparency, how I can include the human in the loop and how I can have reproducibility.

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And a lot of things that are not so shiny, but are incredibly important for a, for a real company, right?

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Not for a, not for a shiny demo in a, in a keynote.

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And that that's something that we're going to say that's that's our for sure is one of our core areas in, in Microsoft discovery is really to continue in that direction of not only a bringing innovation, but bringing innovation in a way that can have real impact in a, in a, in a safe and responsible way that you can also connect with the with the business.

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That's awesome.

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Doctor Inn.

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I'd also like to get your kind of thoughts perspective of what three to five years out would look like.

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But if you could, something that's very important is kind of safety, drug safety, the safety of the process.

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How do we ensure the with all of this acceleration, we keep, we keep that fundamental right at the middle of what we're doing.

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So I'd love to get your thoughts about that if we could.

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Sure, Doctor Andy, One of the biggest advantages of having AI enable systems, better connectivity, better connectivity to different data sources, different data types, is the ability to do something, which I've traditionally called as reverse translation, and I'll explain that a little.

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Reverse translation is translation of information and knowledge from the real world, the real world of patients and HCPS into the world of drug discovery.

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So if you look back, traditionally these are two ends of the spectrum, the drug discovery or you know, and then the real world where the drug product meets the patient, the consumer.

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Now it with all of the advances like the Microsoft Discovery platform, the ability to connect information sources, to gather better data, to organize, structure, collate and analyze better data, and then reason and infer.

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On top of it, we are actually building a pipeline, a discovery pipeline which is enriched with real world experiences.

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And that hitherto has either not happened very consciously in a drug discovery program because of the very nature of the niche skills and the isolation so to say from a clinical trial organization or from a real world marketing organization.

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But now with the information enterprise coming together in forms of people, process, tools and technologies, you have that reverse flow.

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And that is where Doctor Andy directly relates to the reduction of potential adverse events, adverse reactions and safety events with associated with specific drug products.

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And the manner in which it does that is the real world actually is the testing ground for an unbiased drug product where there is no bias, as is there in clinical trials which are randomized controlled trials.

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There is an inbuilt criteria for inclusion, exclusion.

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You know, there is a bias for analysis.

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But in the real world, there is no bias.

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There is no control on who really are consumers of the drug product.

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Those safety events reported in the real world captured by organizations like FDA through the FAERS and the VAERS databases, the Sentinel programs, all of those now are collected by the LLMS, by the body of knowledge and brought into drug discovery programs.

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In terms of feasibility of a drug product which is marketed safe and which is available in the market or a novel de Novo built a computational structure built on potentially predicting adverse events even before it enters clinical trials.

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Now if you realize the amount of CapEx which is spent on design of clinical trials from a safety first perspective and the ability to predict these future safety events, that really offers the pharma organizations a huge handle to weed out and fail early those candidates which could, which are very efficacious but could be very toxic as well to patient populations.

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And this reading out is what refines the pipeline portfolio of going from discovery to translational research into clinical trials and into the market.

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So that loop, which was missing so far through technology, through AI and AI agentic orchestration is now complete.

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And that circle is now a complete loop.

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And it's a continuous self learning, self informing loop with, of course, human in the loop decision making.

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Doctor Andy, I hope that answered.

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Yeah, no, that's fantastic.

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Look, what I've taken away from today's is, and I'd love today's.

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So I mean, both of you, thank you.

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You know, I kind of love these podcasts because I learned so much about them.

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It's, you know, it's a great opportunity for myself to learn and you know, from from working in labs, I kind of feel like I want to get back in a lab now after far too.

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I'm not going to mention that.

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But we've really talking about, I think, a new phase of scientific discovery, a new way of approaching some of these problems.

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And it's not David, you mentioned.

36:14
It's not where scientists are replaced, it's where one where scientists and agents and all of the advanced computation can start working together in entirely new ways, you know, both create new therapies to get that to market so much more quickly and so much more safely.

36:32
Dr.

36:32
Reena, you mentioned this importantness.

36:34
You know, the the real world is what's really important.

36:39
So, yeah, so thank you.

36:40
So, David, Dr.

36:41
Reena, you know, thank you very much.

36:43
It's been a fantastic conversation.

36:47
I would, I, I really think we need to have another, another episode here.

36:50
I'd love to explore more about, you know, we've spoken about human in the loop, but lab in the loop is something which is I think a new idea for me and I everyone who's listening, thank you.

37:05
I would really love to get everyone's feedback on what you've heard, you know, especially in the way

that Microsoft and HCLTech work together here to enable what is to me, I think it's an it's really exciting future.

37:20
So David Dr. Reena, thank you very much.

37:22
Thank you very much indeed.

37:24
Thank you, thank you having us here.

37:26
Thank you so much.

37:29
Thank you.

37:30
Thanks.

37:33
Awesome, that was awesome.

37:37
I, I think we, we could have, I mean, we, we could have expanded this for like 3 hours.

37:44
I told you, I told you.