TRAILBLAZERS TALK

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in conversation with
Dr. Aymen Elfiky,
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Ravi Kumar S. (RK): Welcome to the next edition of Trailblazers, today's guest is a doctor, a data scientist and digital strategist; all put together. Aymen Elfiky is the head of Oncology and Haematology at Brooklyn Hospital. He is a part of the computing lab of the MIT Media Lab. He's been on the advisory board of McKinsey & Company and he has a very diverse set of degrees as well. Did his Masters in Medicine from the Washington University School of Medicine, did Public Health from Harvard University, did a course in Oncology from Yale Medical School and an MBA from MIT Sloan School of Management. Thank you so much for being here.

Dr. Aymen Elfiky (AE): Thank you for having me.

RK: Thanks for spending this time. This is one of my favorite topics, the power of data and digital technologies and medicine. You know, the more I read about it, I realize 80% of what doctors do today, I'm told, with smart hardware, software and data, it will completely change what doctors will do in the future and will amplify what they do. Tell us a little bit about what's happening in this space.

AE: We are seeing that more and more around us, the role of mobile devices, the interconnection between, communication between the different physicians, just in terms of how we are even starting to mine the data in our EHRs and EMRs. The challenge is again the systemic or the scaling of these and really the organizational strategies surrounded around this to really further develop the infrastructure and enable these and to better implement analytic capabilities as well as to better integrate new technologies that would extend these abilities further. However, you change the mindset and that's the key change. It begins with a mindset, so much more to come and including attitudes that need to develop further and that's also at the leadership levels.

RK: And how much are hospitals geared up for this?

AE: EMRs, EHRs they were developed for billing systems, to optimize our billing, not for clinical practice. However, as the knowledge base in medicine - oncology is a great use case - has been increasing rapidly, we're starting to appreciate the needs for that. We're starting to see the inadequacies or deficiencies in terms of our clinical operations or clinical practice and the need to better integrate information and data that is available in these systems but the systems are not developed appropriately. So we are starting to see at the leadership levels, new CMIOs, CHIOs starting to develop, even the CIOs are starting to develop in terms of their roles in these strategies. First and foremost, the CEOs and the boards you're starting to see…

RK: And these are the hospital CEOs?

AE: Exactly right! There are lot of legacy issues to deal with in this context but at least the acknowledgement is there, it's also driven by market forces at the same time. So, globalism, markets…

RK: And market size… Consumers are expecting, patients are expecting, it's consumerism, like they deal with any other service in society.

AE: Absolutely! And I feel that's where the strongest movement is grassroot movement, where I feel there is more access to information, knowledge, more involvement in your own health which is probably driven by economics of rising cost of care and co-pays, for example. So there's more expectations and more involvement in your own care. So there's more expectations of the system and the systems and even the attitudes are not necessarily what we were used to before but we are having to evolve to meet those demands or else they're going to be delivered by others…

RK: If I may ask you, one of the reports I read about is by one of my favorite entrepreneurs, Vinod Khosla, who invests heavily in healthcare. He talks about how AI today can play the role of a radiologist and what needs to happen is adoption of AI for the future. By 2022 or 2023, he thinks you won't need a radiologist and in the next 10 years, you potentially won't need an oncologist and the role of an oncologist will change in many ways. He thinks a primary healthcare specialist with integrated care, powered by AI which will do the specialized job, will be the future of medical sciences. How much do you think this is true and how much do you believe that this is coming and we are not seeing it yet?

AE: In radiology, we are seeing this actually quite a bit. So, I think that's at the forefront of the impact and implications of data sciences and what it can achieve, especially, it really highlights the biases than can be inherent in practice, especially in radiology where the human biases; really how you can be influenced by information that's supplied to you right; but then what about if it's just again, more of an open field and really applied AI machine learning technology to supply to really point out a number of things that we are looking for but a number of things that we may not have had anticipated and then you can integrate other information along with that and you can see where AI can take you. Especially from the radiological aspect.

RK: And can AI do more than what a radiologist does today and actually sense cancer and oncology in a much better way?

AE: Absolutely.

RK: You think so? Wow!

AE: I mean, there's studies that show it's on par but you can on a daily basis you see…

RK: And it's a learning model.

AE: Exactly! It's a learning model. It's growing and it continues to improve.

RK: And do you apply it to your job, yourself?

AE: I do. I mean, not necessarily on the radiology side. I know in Boston where I was before I arrived into New York, there was a lot of studies and a big focus of the forefront initial studies that were being done were on the radiologists, the radiology sciences and the radiology group. Over here what I use is, I'm focusing on the clinical data, re-factoring the data in our EHRs, using data visualization - how I organize it, how I present it to the patient, how I present it to my colleagues to really tell the stories of the patients in a very, more comprehensive and more real way and that influences our decisions; whereas when you just had more of a provincial or marginalized view of certain aspects and you missed the opportunity for a systemic view of that patient and that condition, you really, really divergent choices are made… and ultimately that does not translate to value.

RK: And do you see research on AI advancing at a stage where every discipline of medical sciences will kind of be powered by AI?

AE: It's slow in the beginning, many things are slow. Good things start slow but the momentum builds up, we are absolutely seeing this, especially in the big academic centers. Certainly at Boston and Harvard, we saw increasing integration or collaborations between the Department of Biomedical Informatics and Brigham and Women's Hospital or The Dana-Farber Cancer Institute and here in New York as well, at Mount Sinai. You are seeing the biomedical informatics and data science departments, computer science departments increasing in better, working collaboratively with the medical science departments and ultimately the proof is in the pudding in terms of, it ends up where the challenge is, how do you pilot and test and advance these new models within the clinical setting. This is what's slow on the uptake but this is what's going to increase because we are starting to appreciate the deficiencies in our current structures and understanding the need for more augmentation and even supplementation of our practices as they are now.

RK: And you know one of the other things I kind of have started believing is if all of this becomes real, then doctors would focus more on empathy, on ethical relevance, on human aspects of medical sciences and the cure versus the mechanics of diagnosis. And I'm guessing that's going to go a long way in medical diagnosis and treatment.

AE: I think that's highlighted excellently by oncology, cancer care. That was actually one of the driving forces for me especially as the range of new treatment opportunities and paradigm shifts that were occurring in oncology but the concern was that we were increasingly focusing more on the computer and the numbers and short-sighted data points and less and less on the patients and the people at the receiving end of these values. And this is unfortunately a feature of medicine as we move into this as part of these digital transformations. However, the

hope and very reasonable expectation is that digital transformation and technology properly applied should help to reinforce and allow us to return to that patient-provider relationship and to strengthen that and re-establish that. And that's in oncology, very critical cases and lot of time where the intimacy of the relationships are very much needed, especially in the end of life care, but that aspect has not come out in our care. There's less time to do so, there's less insight to that.

RK: And now we have more time to do that…

AE: Now we have more time to do that.

RK: Every aspect of the body is now amplified with sensors. How much of a role is that going to play for data scientists because there's going to be a ton of unstructured data coming out of it?

AE: Correct. Great point, actually in that area I'll have a question back to you. We make many decisions based on the episodic visits and the episodic interactions with the patients. However, so much is happening in the periods when they're not available.

RK: When they're not with you, yeah.

AE: Great opportunity to come from wearables and the ongoing continuous capture of data, passive capture of data; as well as integration of data from other dimensions of people's lives.

RK: And it's not a deliberate attempt to capture data, so you might get it more real.

AE: Exactly right.

RK: Yeah

AE: It is more real. It's more of the truth, if you will. And you know again if in the clinic we have the time to actually sit down and solicit that data, that information and those nuances from the patients; it would change our interactions right there and then, our treatment choices we may make. However, that again… the practice structures do not allow for that. So, great expectation, great anticipation of what wearable, and the data assets that will come from wearable technologies as well as transactional data that's out there, the question and I would love to get your input on this… How is this ideally going to be integrated and scaled? What is the opportunity at the organizational level that a leader should be paying attention to?

RK: Globally, every industry has legacy systems where unstructured data is sitting. In fact, if you go to manufacturing shop floors there's a ton of data sitting between machines. The ability to bring all of it into a data lake sometimes is a difficult proposition. With legacy systems, they're ready to create microservices so that you could access those systems and put them on a digital front-end and then cross-tabulate them in a way and create statistical models which will help you to find inferences which will help you to find deterministic values of data which is sitting there; which you do not know where the insights are from. I think we go through that with every industry now and it will be very useful to apply it to medical science as well.

AE: You think you're going to have to revamp their existing system or something that could be layered up?

RK: Yeah, it could be layered up; you could open them up and create microservices, you could put an API layer on it, you can remediate them and you don't need to completely shut them down and put them on to new things. That's what we don't recommend to our clients as well; to our clients we kind of say, you should sustain your investments but remediate them so they can be exposed to digital front ends and digital systems and that will help you to leverage the data in a very agile way.

AE: I am glad you highlighted that because that's one of the challenges in my administrative leadership role here, building an oncology-haematology division, is how to keep an eye on the financial aspects of it.

RK: Absolutely, you got to keep the costs down and that's what our clients say- look we have invested in this for years and we don't want to shut it down and create something new; can you remediate it, can you repurpose it and use it in a contemporary way? We go through it and we are happy to help you. You know switching gear, crowdsourcing is a very important part of every other industry now. I haven't seen much of crowdsourcing in the space of doctors.

AE: It will happen better… or the hope is, you see actually aspects is very siloed right now;

you see a number of different sites that different physicians, trainees will go to and as well trying to get more real world evidence on how is somebody doing, how do I handle this toxicity or that issue; you're seeing that also on the patient's sites. There's patient focus groups and blogs around that.

RK: Do doctors actually participate in those?

AE: They do, but it can be very… it's not necessarily curated, it's not necessarily validated. So, there's a level of organization. If we take the example of peer review journals, right? You could imagine that if that could then just be scaled but to the point that's more democratizing this knowledge and not just around one-off research projects here and there but something more that's capturing this real world evidence that's out there and that's at play every day to help us deal and manage many other real world issues that are at play every day in clinical practice. There is a treasure of experience and data that comes from the experience of physicians out there. To mine that, first of all to collect that, to curate that and then to mine that for added insights to be able to deliver that, to prospectively deliver that wherever may be needed. You can see that as augmenting our practices. So, you see aspects of that; seeds perhaps, but again that's the hope and—

RK: But there isn't a platform to do crowdsourcing…

AE: There's no platform, exactly. And that's exactly what's needed to bring it all together.

RK: And how would you incentivize doctors and patients to contribute to that cause?

AE: In terms of organizational perspective, from a competitive aspect; holding on to our data, again appreciating the strength of that from patient perspective and they have access to their data but in this cyber security, cyber awareness and just increasing concerns about cyber security and identity theft and whatever may come in the future; I guess a question then back to you is what is the potential for technology, whether it be blockchain or what not, to more securely allow democratization of all this data?

RK: Absolutely, I think every crowdsourcing platform has the same set of challenges and … there is a challenge of adoption, there is a challenge of how do you get people onboard to contribute to it; so that they see value in it and they take value out of it. But somebody has to make an attempt to start this in the space of medical.

I had one last question for you, I want to squeeze this in. You know, yesterday I was at a dinner and I was hearing about how Google is investing so much on health and at some point of time you just have to feed your CT scan or PET Scan and they're going to tell you what the results are and there's a lot of data and lot of AI underneath it. How much of this is real now?

AE: You're seeing a lot more, especially Google, Amazon, we've seen movements that they're making, Apple as well… So, big push into healthcare. Their strength I believe is really their access to the consumers that are out there, as we move to this consumer-base age. But absolutely you can easily see how they can move from what they're currently able to deliver upon. They're always learning from your actions, from your needs, anticipate your needs within medical science…

RK: And they have passive data as well.

AE: And passive data as well. That's a great strength. You can easily see where this is; where they're going to be heads and shoulders above what individual medical centers are able to do. But at the same time there's a strength to come from the collaborations between the two and you're seeing a lot of that from Google, but at the same time with the payers. Ultimately, there's a term I like to use in terms of companion analytics; you know you've companion diagnostics that help you to make diagnostic assay that is used to help you make the best treatment decision in terms of will this drug be efficacious or not in this case, same thing around companion analytics where basic analytics, AI will increasingly grow. But from a more clinical perspective, better understanding the patient at that point in time relative to the journey and their whole experience up to that point; understanding what are going to be the implications on the different dimensions of their life. You know, it's not that they are quality. And all this feeds into value. So, again this is going to come from the accumulation of data across different dimensions of the patient and population at large across their lives. This is where you see Google, Amazon, Apple, Facebook; you see where they have the advantage there. But at the same time they do have to and they will, I've seen that at play already, integrate with existing health systems.

RK: Yeah, in fact I had one other area which I'm sure you'd appreciate, there's drug discovery lifecycles that have changed from 10-15 years to 2-3 years; because of the power of data you could move it much faster, because of the availability of data.

AE: Correct!

RK: And I know that you're working one of the other things, I read a paper from you which is about measuring mortality rates for oncology patients using data analytics.

AE: Big area, again going back to what we were talking about in terms of the potential to better connect with our patients. So, short term mortality. Again it was highlighting in the papers, we highlight and it's known that physicians are not great at prognostication, right… again we don't analyze the appropriate and even our mindset where we are focused really. It comes from an honest place, wanting to do more for the patient and keep on fighting. But at the same time we do, again from the physician perspective, we understand the limitations and we understand what a body can take in and what it cannot. This is further informed or more realistically informed by data if it is presented and consumed the right way. And so that was the purpose of that paper to show, really capturing, looking over the entirety of the patient's experience and the patient's lifecycle and the number of treatments, trends that are happening and this is what's not presented by the EMR. But if you are able to again present the data and consume the data in that way; it dramatically changes your view of the patient and will dramatically change your approach and interaction with that patient. And hope that this will bring back the humanism that is required in that view that we're losing increasingly. You know that brings back the ethos.

RK: Absolutely, thank you so much. That was a great way to close the note. Human ethos is probably the most critical piece of what we need doctors in critical care to do. Thank you again for talking to me and it was a such a pleasure talking to you and thanks for dropping by in our office.

AE: Very nice, thank you!

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