GENERIS

Speaker Spotlight

September 2017

THE DEMOCRATIZATION OF HEALTHCARE TECHNOLOGIES

An Interview with Palani Palaniappan,

EVP Innovation & Development, Terumo BCT

We are thrilled to have Palani Palaniappan joining us at the American Medical Device Summit, held in Chicago from October 4-5, where he will be discussing "The Democratization of Healthcare Technologies".

Palani brings more than 25 years of experience in product and project development, engineering, scientific research, and global business and technology management.

We sat down with him in advance of the event to talk about how leapfrogging technologies in emerging markets are providing more and more people with access to healthcare, how companies can design medical devices to suit the needs of people in emerging markets, and how innovation in the developing world is, in turn, influencing product innovation in developed markets.

TERUMOBCT
Unlocking the Potential of Blood

OVERVIEW

- Affordability and accessibility of healthcare as a global issue
- How products designed for developed healthcare markets miss the mark in serving unmet needs in developing markets
- Leapfrogging technlogies and the democratization of healthcare
- How concepts such as *Reverse Innovation*, *Jugaad Innovation* and *GEMBA* impact product design for the underserved market of 5 billion people
- The benefits of innovating within constraints

What are some reasons that products designed for developed healthcare markets do not transfer well to developing markets?

Many times, people in developing markets have different needs and constraints than those in developed markets, so products may not transfer well. A common mistake companies make is thinking that it is enough to simply defeature a product that is engineered to meet the needs of a developed economy. For instance, they will develop a product for the U.S. market, then remove the more costly features to meet a price point they think will sell in a developing market, such as Africa or India. But price alone doesn't get you there. **Yes, the product has to be offered at the right price point, but also, 100 percent of the features have to be appropriate for the market. Price alone won't drive sales if the features aren't appropriate.**

What would you say are some of the biggest healthcare issues and opportunities facing developing markets?

Developing markets face two big challenges: infrastructure and training. By infrastructure, I mean aspects of the environment where a product is used. Some examples: What are the roads like? Will your device survive a 1,000-mile journey in the back of a pickup truck over rough, rocky, unpaved roads? Once it arrives, are there elevators, or will your device need to be dragged up six flights of stairs using the handle? Is there a constant supply of electricity to power your innovation? What about electrical surges? Are patients coming to a centralized location for care, where a large device might work, or is care decentralized, requiring your technology to be portable? We can't take these things for granted.

When it comes to training, it's interesting to look at some developing nations in Africa. There are a handful of countries—Zimbabwe, Tanzania and Kenya are examples—where there can be fewer than 6 physicians per 100,000 people. So one might have developed a product imagining it will be used in a hospital, but patient access to the hospital itself may be an issue. More likely, a physician is not the person who will use the device, rather a field technician. As another example, a radiology procedure developed in Japan, where people go to a centralized facility to receive treatment, may be impractical in many developing economies where such facilities do not exist. You would need to decentralize that procedure, taking radiology to the patient. The device would need to be portable, battery-operated and possibly able to transmit information using cell phone technology, so the images and information could be relayed to a central office where physicians work. The person administering the procedure may not have the same healthcare training or knowledge, but capturing the images may require less training than diagnosing the patient based on the images.

Given the unique needs of developing economies, how can medical device manufacturers design products for people in these markets? What is the appropriate way to do this?

When considering the design process, I talk about three terms that most of us are familiar with and that have been subjects of articles in the *Harvard Business Review* over the last decade:

Gemba, which is a Japanese word meaning roughly "being at the site of action." This is a term that's typically used in a manufacturing setting, meaning one has to get to the factory floor to see what's happening. But it is used all over now, though it goes by different names: ethnographic research, anthropological research, human-centered design, Stanford design thinking … I talk about Gemba as a unifying word. Whatever you call it, you have to do it. Many have failed by sitting far away from the patient and thinking they know what the patient needs. You must immerse yourself in the culture and observe how people live and work and what their unique needs are.

Second, when you cater to developing—and often cash-strapped—nations, affordability and accessibility are critical. I use the term **Jugaad innovation**, which means frugal innovation. This has been a subject of a book by Navi Radjou, Jaideep Prabhu, and Simone Ahuja. It's about utilizing existing resources in the area and actually tethering together a technology that will meet the needs of a given medical condition in an affordable way. In the developed world, we think about **value for money**: creating value to charge a high premium. In the developing world, we should not be thinking about high premiums. We need to think about **value for many**: the profit margins will be lower, but business will succeed because of volume. We need to be thrifty in product development and innovate within these constraints.

The third idea I talk about is **Reverse Innovation**, which is really interlinked with the first two ideas. This concept was pioneered by Dartmouth Professors Vijay Govindarajan and Chris Trimble and GE's Jeffrey Immelt. Many companies—like GE, Siemens and Renault—have come up with innovations that meet the needs of the developing economies first, because that kind of constraint places a discipline on the innovators. Constraints feed creativity, with the challenge here to ensure we create an affordable product. But developed markets also face price constraints—more and more so. So an inexpensive product developed for a cash-strapped market may also be perfect for developed markets. As an example, GE created a low-cost, portable electrocardiogram device to serve the needs of tribal populations. This device was made for about $300, as compared to a similarly functioning device used in centralized labs in the U.S. that costs about $30,000. GE then launched essentially the same product in the U.S., where it turned out to be pretty handy for use in ambulances and more decentralized healthcare facilities.

There are so many examples of these concepts in action. For instance, GE, as well as companies like Siemens and Phillips, has come up with portable ultrasound devices, handheld sensors that are connected directly to your iPhone, iPad or other mobile technology, which are all becoming so common around the world. You can carry these devices into the field and essentially address the healthcare needs of the emerging market with something as common as a smartphone. We are 7.5 billion people, living in a world with 22 billion connected devices!

Would you say this is one of the ways emerging markets have leapfrogged to using new technologies? Can you talk a little about the effect this is having?

Absolutely. I often talk about how our world today is interconnected. As I mentioned before, we have a population of about 7.5 billion. Today, about 5 billion of us already have access to mobile technologies. And it's estimated that by 2020, nearly every human will carry some form of mobile device. Telecommunication devices have essentially disrupted everything that's known to mankind, from transportation to banking to healthcare to communication and much more. So if you think about healthcare technologies that are simple, that are easy to use, that are connected to mobile devices … you accomplish many things. You decentralize and democratize healthcare, bringing it to the people. I think of that as "healthcare at the home front." People everywhere have access to mobile technologies. Even in cash-strapped economies. Even in places where there is a scarcity of food, clean water, healthcare and education. These communication portals enable telemedicine or digital medicine, and that's going to transform the field of medicine across the world, cash-strapped or otherwise.

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What do you see as some of the greatest innovations that are democratizing healthcare?

If I may, I would like to start with an example that is not healthcare-related. Today, we can make a car for about $2,000 in India: the amazing Tata Nano. Only 10 to 15 years ago, we could not have imagined a car with an internal combustion engine being made at that price point, having all the minimal but necessary comforts you would want. A similar example has happened in Eastern Europe, where Renault makes a car for around $8,000 by sourcing parts locally and relying on local manufacturing capabilities. This is also a case of reverse innovation, as these cars are now sought after even in Western European countries. These examples illustrate how the consumer goods industry and automobile transportation are being democratized in ways we couldn't imagine not too long ago. I use them to show what is possible in the medical device industry, but I often say that, in healthcare, some of the greatest innovations are not merely product innovations.

Two examples illustrate this: The first is Aravind Hospital, a cataract eye surgery hospital in India. How did they achieve a healthcare outcome on par with, or even superior to, that of a developed economy? I think it was holistic thinking about how to address healthcare for the many. They created a unique business model where everyone—rich and poor—receives the same quality healthcare. This is value for many versus value for money. The procedure is done quickly, by world-renowned physicians, and outcomes are excellent. They even make low-cost, high-quality lenses locally.

The second example is the world-renowned NH Hospital in Bangalore, India. They perform cardiac surgery for about $2,000 per procedure, with an outcome that's superior to that even of developed economies in the Western world, where these procedures can cost 50 to 100 times as much. NH has world-class physicians operating, and they have created value for many by making this surgery accessible and affordable. These are some examples I like to highlight as ways you can democratize healthcare, not just with products, but by thinking about the whole ecosystem to serve healthcare needs. **Technology plays a role, but ultimately you have come up with business models and processes that are successful and create viable, sustainable businesses.**

Let's talk a bit more about the business aspect of this. You speak of the concept of value for many versus value for money and you've given some examples of success stories. Do you see these ventures as generally being profitable or more of a social imperative or social enterprise?

Let me first credit Professors Govindarajan and Trimble for recognizing the concept and coining the term *reverse innovation* that I have borrowed in this discussion. You may have also heard of a late strategist by the name of C.K. Prahalad, who authored the book *The Fortune at the Bottom of the Pyramid.* In essence, it says that you can use social entrepreneurship **and** you can make a profit by serving the poor. But you really need to understand the needs and how to address them. This is where the Gemba comes in.

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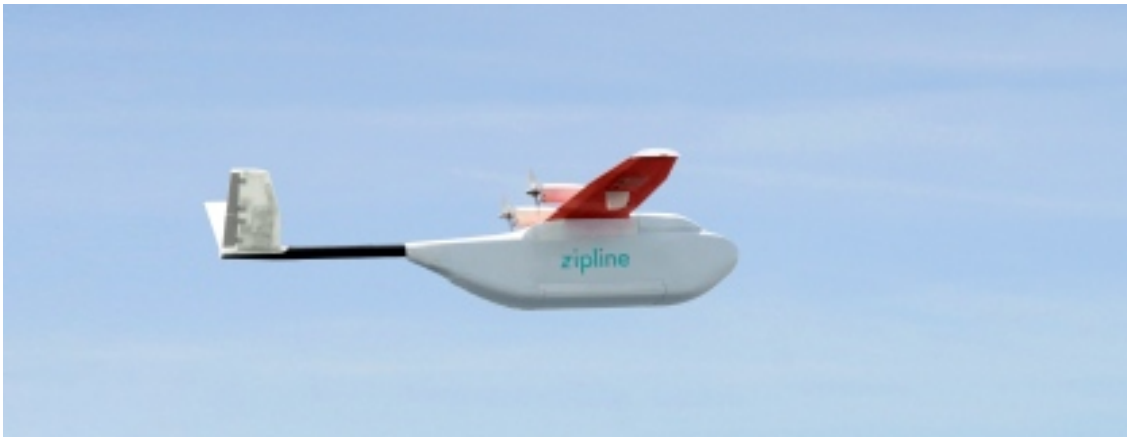
Until now, corporations have served only the top tier of the world's population: the top 2 billion. That leaves 5 billion people underserved. The underserved can maybe only spend $1 per day, instead of say $100 in the developed world, but the sheer number of them make it profitable. By addressing these people and their needs, companies who have done it right have thrived.

Let's take Gillette, owned by Procter & Gamble, as an example. Realizing that developed markets were saturated, P&G was looking for new opportunities. There are 500 million men in India they wanted to reach. So Gillette started product development on razors for the Indian market, not realizing that for most of those men, electricity—and therefore lighting—is a concern, that there are specific benefits to shaving with a double-edged razor and that most men in India are more focused on not cutting themselves than on getting a really close shave. Going into that market with a 3-blade or 5-blade razor is useless because people who don't have unlimited access to running water dip their razor in a cup of water when shaving, so a multi-blade razor just clogs. P&G did their research, but there was a problem—they only did research on Indian men living in the U.S. as surrogate representatives of the Indian market. They then made the common mistake of simply introducing a defeatured product, designed for men who like a close shave, have running water and can shave every day in a well-lit area. The launch was a huge failure. Subsequently, they spent 3,000 hours in the market, doing extensive Gemba and watching men shave. They came up with a concept for a single-blade razor, manufactured in India, that was safe and cost just a few cents. This was the Gillette Guard. They were able to very soon corner the marketplace, replacing double-edged razors, and it became a huge growth market for P&G—all because they followed the principles I talked about: Gemba, Jugaad and Reverse Innovation.

How is all this innovation in emerging markets influencing the developed market?

Western markets are becoming saturated. And affordability and accessibility of healthcare is a challenge worldwide in every market. We've heard this many times now—it's become the common sentiment of the populist way of thinking:



"Healthcare is too expensive. Drug prices are being controlled. Device prices are being controlled." And it's true! Against the backdrop of people living longer and population growth, it is not sustainable to continue serving developed markets with high-premium products.

In India and several other emerging economies, there is extreme price control on medical devices, those classified as "essential medical devices." For instance, the cost of a stent has been forced down by 70% of the list price. Same for technologies like hip replacements; price controls have forced the list price to drop by 70%. So if you have modeled your business on that kind of a premium, it is not sustainable. You really have to think about innovation given the constraints of the marketplace. When you think this way, the same products can have an impact in the western market, because affordability is still a challenge for the western market, where markets are being saturated and prices are being eroded.

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What are your predictions for the medical device market in the next 5 to 10 years?

If you remember, I talked about the interconnected world and the vision of every human being connected with mobile technologies; you've probably heard Mark Zuckerberg, the founder of Facebook, and the Google leaders talk about it. That vision is going to be real. These are leapfrogging technologies, and there are a few that will be particularly transformative. First of all, wearables. Wearables are possible not only because of advances in telecommunication capabilities but also because the cost of sensor technologies has gone down so much. Nearly every object on the planet will have a sensor on it, transmitting information. So the world of digitization is real, and this will be transformative not only for healthcare but also for other industrial sectors.

Drone technology is another leapfrogging technology. In Rwanda, drones are being used to deliver blood products in emergency situations. In a place like Rwanda, in the rainy season, you would often not be able to get the lifesaving gift of blood in time to save the life of a patient in need. In Africa, transfusions are commonly needed by prepartum and postpartum women, and access to blood and blood safety are huge concerns. It can take 4 hours to deliver blood products to that needy mother, given the poor infrastructure, the rain and the hilly terrain. However, a company called Zipline from California has devised a very inexpensive drone technology that they are using to deliver blood products to rural areas in about 15 to 20 minutes. There are case studies of women impacted by this lifesaving technology.

This example shows how an inexpensive technology can replace the needs for a costly heliport or airport to deliver lifesaving products. This is no longer a pipe dream—this is real, and we'll see it again and again in the future. This is also a case of reverse innovation, by the way. The same technology is now being used in Switzerland, where Swiss Post is testing it to deliver time-sensitive medical products in densely populated areas where speedy delivery is impacted by congestion, traffic and other issues.

So, actually, this is a good example of everything I've talked about: leapfrogging technology, Gemba, Jugaad and, finally, Reverse Innovation.

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That is a great summary. Lastly, can you give us a little teaser about what you will talk about at the upcoming American Medical Device Summit?

In a nutshell: healthcare is being democratized. To serve the needs of the growing population, the emerging world, it *has* to be democratized. There is no other way to reach the many. The breakthrough technologies that are happening well outside of the healthcare industry are going to define the healthcare industry as well. And, I think, we will see these technologies also impact developed nations. I intend to share examples of some of those technologies that will come to play in the healthcare sector and be transformative, as well as give best practices in the industry. I look forward to attending the conference in October and learning from other leaders in our industry, too. Thank you!

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Terumo BCT, a global leader in blood component, therapeutic apheresis and cellular technologies, is the only company with the unique combination of apheresis collections, manual and automated whole blood processing, and pathogen reduction technologies. We believe in the potential of blood to do even more for patients than it does today. This belief inspires our innovation and strengthens our collaboration with customers