

Engineer, entrepreneur, Filipino

Silicon Valley innovator Diosdado P. Banatao

by Rachel C. Barawid, Sara Grace C. Fojas, Ronald S. Lim and Jayson R. Mangalus

February 23, 2014



Photos by Jacqueline Hernandez

“I may have lived most of my life in the US, but you cannot get away from the fact that where you come from is also very important. There’s that tie, always, and if you have the means to help, why not? I would like to leave this Earth thinking that I took advantage of the opportunity.”

These days, there are only a few good men who deserve the highest respect, admiration, and emulation of Filipinos. One of them is engineer, innovator, and entrepreneur Diosdado “Dado” P. Banatao.

The son of a farmer from a small barrio in Iguig, Cagayan Valley, Banatao didn’t only manage to become successful abroad, but has remarkably done what no Filipino has done before – to make it big in Silicon Valley in California. His success is due to his hard work, brilliance, vision, talent, and determination.

Dubbed the “Father of Semiconductors,” Banatao invented two of the foundation technologies in every PC today: the PC chip set, and the graphics acceleration architecture. He has founded three technology startups: Mostrom; the S3 which became the third most profitable company in the world in 1993; and Chips & Technologies, which he sold to Intel for about \$430 million in 1996. Today, he is the managing partner of Tallwood Venture Capital, a company engaged in semiconductor technology solutions for computing, communication, and consumer platforms.

“In the context of things that I did that made an impact worldwide, it was really the personal computer (PC). The PC chip set is about re-architecting the entire system to lower the cost for higher performance and making it compatible with the IBM PC. I took it for granted that other people will be able to do this but until Intel bought that company, no one could ever compete with us,” says the 65-year-old cum laude graduate of Electrical Engineering from the Mapua Institute of Technology.

Banatao worked in the US and enrolled in a graduate study program at the University of Washington. A licensed pilot, he was among the design engineers for the Boeing 747. However, he left the company to pursue what he truly loved to do – engineering. He pursued a Master of Science in Electrical Engineering and Computing Science at Stanford University. Years later, he found himself trading ideas over beer and banter with friends Steve Jobs and other brilliant engineers and professors in the Homebrew Computer Club.

But more than his innovations and achievements, what makes Banatao truly impressive and inspiring is his giving back to the country through his family foundation, and now, through the Philippine Development (PhilDev) Foundation.

Banatao and his wife Maria have been providing scholarships to deserving kids in his hometown in Cagayan and to Filipino-Americans in California, sending them to the top universities in the US. But in his desire to do more for the Philippines which is lagging behind in science and technology and engineering, PhilDev was created.

“We created PhilDev in 2010 when we embarked on a strategic vision for helping the country in terms of science and technology-based innovation and entrepreneurship to promote economic growth. I was there since the beginning because it was formed by a lot of my research,” he says.

To achieve this mission, PhilDev is working to strengthen education and training programs for youth in science and engineering and to produce a higher ratio of qualified experts and practitioners; to provide relevant research; to promote a global network of relationships to create and sustain S&T innovation and entrepreneurship in the country; and to help link knowledge generation and enterprise development.

One of PhilDev’s projects in partnership with the United States Agency for International Development (USAID) is the Innovative Development through Entrepreneurship Acceleration (IDEA), a three-year program that aims to bring entrepreneurial culture and skills into the science and engineering education system in the Philippines. Activities under IDEA are the annual symposium for Philippine universities, entrepreneurship workshop series for science and engineering scholars in the Philippines, and a training mission program for visiting US professors.

“The symposium next month will be hard-hitting. We want to be able to use that accumulated knowledge that we’ve learned and bring it here. It’s up to the leaders here whether they’ll listen and implement something. We are not afraid of pushing them. We are not afraid to say, ‘That doesn’t work. Here’s a better way.’ That’s really the value of PhilDev.’

In this 60 Minutes interview, the unassuming Silicon Valley visionary shares with us his journey to the top, starting from his childhood days as a math genius, the sacrifices he made while building his career, and his passion for helping his beloved home country. (Rachel C. Barawid)

STUDENTS AND CAMPUSES BULLETIN (SCB): What's the state of science and engineering education in the Philippines?

DIOSDADO 'DADO' P. BANATAO (DPB): The quality of education in science and engineering is inferior.

SCB: Inferior? That low?

DPB: We are only better than Cambodia. Vietnam has already overtaken us in the last few years. Technical universities, whether it's UP (University of the Philippines), Mapua or whoever, were behind, way, way behind, so there is no exception.

We need to really improve our science and engineering education. We do not have enough experts to compete in the global market. There are many, many reasons for that. First of all, the Philippines, compared to other countries is way down the list in what most people call science culture for whatever reason. Somehow, students starting from the elementary to high school then eventually to college, lose the path to this science culture. So how do you expect to produce world-class scientists and engineers? That's the root cause. We need to improve our educational system all the way to the university systems and then to Masters and PhDs and make sure that we have enough population of scientists and engineers.

The number of PhD professors in our engineering schools or higher education institutions in the technical field is very, very low. You will probably be surprised with the statistics that a few years ago, there was only one country below us in the Asian region, and that is Cambodia. But they are ramping up and I hope they do not catch up with us yet because otherwise we will be at the bottom of the ranks in Asia in the expertise of science and engineering.

So there is no surprise that we cannot disrupt these imports. You guys buy these (points to the SCB staff's mobile phones), you are giving a lot of money to other countries who are designing these things. So we have a flight of incredible amount of money because we do need these tools which are very necessary, very productive. So if we cannot even do our own tools, we cannot disrupt the imports, we then have a very severe imbalance in technology products.



ON HIS LOVE FOR MATH: 'I am a natural engineer, I just loved that feeling. When I was in engineering school, I made sure that I solved all the examples, the set problems in any textbook twice!'

SCB: Do you think that government is lacking something in addressing these concerns?

DPB: Oh, we have many things that we lack (laughs). Assuming that we have enough engineers who are capable of designing these phones, the thing is we don't have a manufacturing industry in the country.

A long, long time ago, we had almost all semiconductor Silicon Valley companies here in the Philippines. As early as 30 years ago, the Philippines was the place to go in Asia for manufacturing, assembly of chips. Back then, they were doing a few more advanced packaging and then testing. By mid 80s, they were beginning to leave. By the 90s, I would say three-fourths of those companies had left to go to Malaysia, Indonesia, Vietnam, and other countries. Why? Because from a business point of view – and I consider myself a businessman also – why would I continue to put money into a foreign country where I know that the growth is limited? That country does not have the necessary expertise to support my company so I would go somewhere else. They (businessmen) are there to make money and in the case of manufacturing, you have to keep on lowering your cost. But we didn't have the right experts to help them lower that cost. And then there is the infrastructure and power. It's a simple business case for them. Now, we have a very few left. They went to other countries that are able to produce engineers who can really help their efforts.

SCB: Why is that?

DPB: Well, it's because we do not have a science culture that is comparable to other countries. In technical education, it's the fact that we are not putting enough investments into this field of technology. When I say investments, it means investments in human resource development, mainly faculty. Aside from the very low percent of faculty in engineering with PhDs, the teaching is very mediocre. We have very few real researches going on in universities. Even those with PhDs, if they don't do deep research, that knowledge will go down because technology moves so fast and if you don't keep on doing research, you'll go down very quickly. The basic problem is people.

GIVING BACK

SCB: Are these the reasons you decided to set up the Philippine Development (PhilDev) Foundation?

DPB: Well, from a world economic standard, the Philippines is a poor country. At least 30 percent of our population is poor. I looked at all the different initiatives from all kinds of foundations helping the country, from USAID and other private foundations, and I observed that no one was really focusing on the overall root cause of poverty. And that is we do not have the necessary tools to create a thriving industry in technology. It has been confirmed by economic experts that the reason a lot of the developed countries are there now after World War II is they leveraged three things. One is their internally developed technologies to create globally competitive products and services. Second is they were able to attract foreign direct investments because they had the technologies. Third is the ability to put out globally competitive products that served the global market.

In the case of a developing country like ours, our economy is really sustained by our own population's ability to save, meaning money that is being put into banks as savings. The banks in turn use those deposits to invest in many different things and that's what grows that money. The people who are putting their money in the banks get some returns that they spend on investments. But in the Philippines where there is limited investment to spur the growth, what would one need then is to pull that money for investments and instead bring in direct foreign investments (DFI). So the focus is how to create technologies that will attract investments. The nice thing about these is that it brings in more technology and global market knowledge. We just keep on spiraling up and that's what really spurs the growth.

That is what got us to that strategy, the fact that nothing else before that ever worked and our further reading or research is that humanitarian or charitable helping don't move the economy; they are being spent right away. In a situation like that, the rich gets richer and poor gets poorer so the division between the rich and poor just gets wider.



ON IMPROVING S&T: 'We have to show everyone that we are finally serious about solving these problems. We want to take on the challenge. I have proven this myself. Slowly but surely, things are happening.'

SCB: Are you working closely with the government for this?

DPB: I think that PhilDev is the only organization or foundation that started to work with the government about six years ago, to address this issue of generating enough experts in the field, PhDs and Masters in engineering. We did some R&D (Research and Development) projects with the government and proposed to establish research institutes that will get us to a level equal to some of the top universities in the US after it's done. The ERDT (Engineering Research Development for Technology) is a five-year program to do advanced research in Information Technology and Health Sciences, Transnational Medicine, and things like that.

We have to show everyone that we are finally serious about solving these problems. We want to take on the challenge, we're up to it. I think the board of trustees have the necessary knowledge. I have proven this myself, building my career in Silicon Valley, so why not in the Philippines? I am Filipino, you know, it's still there. So it's a quest. But slowly but surely, things are happening. We are generating more PhDs now.

SCB: So PhilDev is providing scholarships to faculty and students?

DPB: It is a scholarship at the undergraduate level. We pick the top student candidates all over the Philippines and give them scholarships as they go to engineering. But it's not just money. We have this program that makes it very personal – a lot of advising, mentoring, a lot of knowledge of what is in the industry. We have summer retreats where we bring in professors, entrepreneurs, and industry executives.

This was patterned after my family foundation. We have a similar scholarship program in the US for Filipino-Americans to go to all the top universities in the US. Not surprisingly, we are as good as anyone and so we are taking those best minds and put them in the top universities, MIT (Massachusetts Institute of Technology,) Stanford, Berkeley. We are really, really good!

SCB: I learned that you are allotting P1 million for each student?

DPB: Yes. These scholarships are funded by corporations like Shell. We are working with industries so that when the PhilDev scholars graduate, they have a place to go right away. So that sponsorship, while it is financial, is to get them through college the best way they should and then eventually they go to their sponsors, if they like it. But they are not required to apply in these companies.

SCB: Will they be able to study in schools in the US too like those scholars in your family foundation?

DPB: Not at this time because this is for undergraduates. The same universities that we are working for the ERDT are also the target universities for these scholarships, and we are expanding it now to others.



ON MAKING IT IN SILICON VALLEY: 'It's very difficult. Entrepreneurship is hard. The probability of failure is nine out of 10. The work hours. What family? You don't have a family. I just got lucky my wife understood what I did.'

SCB: So it's not the typical scholarship program?

DPB: No, you just don't give money – it is usually a losing proposition. Let's face it, the world is not perfect, there is a high fall-out if you leave that scholar alone. It's hard to take engineering in the first place and then you take a kid away from the province and bring him here. There are few little issues there that need to be taken care of.

I come from Cagayan and during my first few months in Mapua Institute of Technology, I wished I could just go back, take a ride and be in my home in an hour. But there's no such thing. At the end of the day, it's that kind of support, that intangible, that will make a difference in whether that soon-to-be engineer will be successful. And in a scenario like the Philippines where there are very, very few good true engineering jobs, you have to go beyond the grades in the technical courses. Companies are looking for that complete employee.

SCB: Can they stand a chance even if they don't come from the top schools?

DPB: If the kid has proven himself regardless of what school he comes from, passed the board, his aptitude is there, he has that intangible, companies will go after them. It's a very different world once you graduate, you throw away where you come from. It's a good to have a degree but then, you really can't do much (laughs) there's a lot of training. Engineering is a tough profession. So even the brightest minds fresh out of school, we put them under a program where they learn from the guys who have done it already. We just can't let that new graduate go by himself. They won't learn that fast. Engineering is that hard.

SCB: When did you start thinking about giving back to your country? What was the turning point?

DPB: The turning point was after my first start-up went public. The nice thing with giving back is if you have the resources, then you can really apply your giving back to the right things, without compromise. But if you don't have that resource, it's difficult. Looking back, I was glad that happened to me, taking two of my start-ups public, because I may have lived most of my life in the US, but you cannot get away from the fact that where you come from is also very important. There's that tie, always, and if you have the means to help, why not? How many opportunities does one have to be able to help your country? There are very few opportunities, and very few people actually have that opportunity. If it comes, and you realize that you can make an impact, then that is rare. Let's face it, we all die and you can't take this with you anyway, so what do you do? You share it. I would like to leave this Earth thinking that I did it, that I took advantage of the opportunity.

A NATURAL ENGINEER

SCB: In your speaking engagements, what do students say after inspiring them of your lifework?

DPB: First of all, there's this blank stare at you (laughs). How do I do that? I had the hardest time using myself as an example before so I always talk in the third person, because when you say "I," it sounds like bragging. I realized over time that it's useless so I became more up-front. I describe where I came from, how humble my family was, and how father sacrificed for us. He was a farmer and he loaned for our tuition fees. My parents cared about education and he left it up to us to pick where we want to be.

SCB: Who inspired you to go into this field?

DPB: I was lucky enough to have a high school counselor during our senior year who often talked to me and my classmates. In our very first meeting with him, he just said, "You should go into engineering."



MAN FROM THE 'VALLEY'—Photos show (clockwise from top left) Silicon Valley's Dado Banatao returning to his hometown, Iguig in Cagayan Valley; with the scholars under the Banatao Family Filipino American Education Fund; with his wife Maria; and with Philippine Development Foundation board members and organizers.

SCB: He already had that vision of you?

DPB: Well, he looked at my grades saw where I was good at and clearly it was Math, Physics, and he made that conclusion. Those classes, the very first math course that I had in high school, I just loved it. I couldn't get myself to do the other homework in the other classes. I just wanted to solve Math problems. I hated Humanities (laughs). Why do I need to study Aristotle, Voltaire? I didn't care. I didn't like history. Until the dean took me to his office one day and said, "We have a problem with you." "What Father?" "Look at all your other grades, and then your grade in history. You have 75 percent average. Your other grades are 95, 98. Do you study history?" "No, Father, I don't like history" (laughs). "Okay. Could you put at least maybe one hour here and there? Let's try doing that." And I did. And then immediately it went up. So it's your nature right? If you like something, you spend time on it. And that's what I did in high school.

I am a natural engineer, I just loved that feeling. When I was in engineering school, I made sure that I solved all the examples, the set problems in any textbook. I solved every problem in those books twice.

SCB: Twice? (laughs)

DPB: Yes, one is during the course of the whole semester and then the other one before the finals. Mapua had a system where you are exempted from finals if you attain this average and I told my professors, "No, I'll take the finals anyway." "What?" "Yeah, I'll take the finals because I wanted to go through all the problems again."

You would probably say I was crazy. But that's the thing that we need to do here in the Philippines. We need to have that population of scientists and engineers that can compete. From there, provide enough funding for more research in the university system so that we can catch up and then bring in entrepreneurship to create products and services that are competitive. There is no better known solution in spreading of the diffused results of wealth other than entrepreneurship. At the end of the day, it's not the big companies, it is creating those start-ups that can build up the jobs much faster. Entrepreneurship is a solution. It's well known that even First World countries talk about the need for innovation and entrepreneurship.

BUILDING A NAME IN THE US

SCB: How difficult is it to make it big in the States?

DPB: It's very difficult. Entrepreneurship is hard. The probability of failure is nine out of 10. It's pretty much a category of suicide. Maybe I got lucky. I have multiple companies that I started myself or funded. Maybe the first one is luck but after a while, what comes out is a process that you have to go through that is proven. Since I am doing investments now, I make sure that the companies I invest in go through that process to enhance their chances of being successful.

It's hard. It's never easy. The work hours. What family? You don't have a family. I just got lucky my wife, Maria, understood but what I did before I started my first company. All summer after dinner we walked around the neighborhood and I talked to her about it. And what convinced me that she finally understood what it takes is that in one of those walks, she said, "You know, years from now, I don't want to be the person hearing you say I should have done it." She would not like for me to blame her that I didn't do it. And then we sat down with our kids and I explained to them what it would take, what it is to be an entrepreneur.

What we did was we loaned money. I got lucky that my company went public. But if you think that after one success you can replicate it, the probability is even much higher that you would fail. I got lucky again in my second starter. So I just continued doing that as an investor.

SCB: Did you ever experience discrimination?

DPB: No. In engineering, at least the way we did it in Silicon Valley, either you're good or no good. If you're no good then, get out because you will get cut out anyway. All kinds of nationalities go to Silicon Valley. I compete with them and the reason that I think I'm better than the others is I imbibe in myself the natural liking to it. I outworked them simply because I loved doing it since my school days.

SCB: How was it to be part of a club with Steve Jobs, and some of the other best minds in engineering and technology?

DPB: You're talking about the Homebrew Computer Club. Oh God, we were mixing that. That was after I got my graduate degree from Stanford University. There were 30 of us experienced engineers and professors, and we would just exchange ideas. We criticized each other's works. "Are you crazy? That doesn't work." Something like that. But we were not afraid of challenging each other because we shared the same passion. I have not read the Steve Jobs book yet but I think that club was mentioned. We were at Stanford. We were using one of the companies near Stanford, using the conference rooms and so on. The benefit of that was we actually thought that we were way ahead of most people in thinking what makes sense. Then they got busy and I got busy, it gradually died. There was never a Homebrew Computer Club again after that. It was never duplicated.

SCB: Or maybe the competition has become more cut-throat?

DPB: It could be. In the end, we competed against Apple. I designed a product, the personal computers. We didn't know what they were doing, they didn't know what I was doing, too. We were able to deliver the product ahead of them. And we beat them, hands-down initially. Especially in Europe, we just outsold them.

But you can see Steve Jobs' passion in terms of the marketing side. It's beyond technology. He was not a techie but he was able to see through how technology can be used better. Eventually they caught up with my company and now it's history.

SCB: How do you feel being called "The Father of Semiconductor," "The Filipino Bill Gates?"

DPB: That is not true, by the way. I don't know who started that. No one will ever equal Bill Gates. He did his stuff in software, I did mine in semiconductor, there's no comparison but you know Bill is Bill. Actually in my first company where I did the chipset, and in the S3 Graphics, we spent time with Microsoft. We met with Bill and exchanged a lot of ideas and when Steve Ballmer became Chief Executive Officer (CEO), he used to spend the whole day with us talking about technology. He's not a techie but he wanted to make sure that we moved in the right direction. It took a process of six months to put that all together and luckily they understood it. They knew that if, let's say, my company was able to do that, it would really help their software so we collaborated. The rest is history.

SCB: In your company, do you see a lot of promises in the young people that you've absorbed?

DPB: Oh, yes. There are so many engineers who were working in my two starters that have their own companies now and that's the beauty of entrepreneurship. You can spread that expertise very quickly and that's the difference between Silicon Valley and other areas in the world. The knowledge diffusion is much faster because it's free thinking. We helped each other in the early days. I can call any of my friends here.

SCB: Is it the same culture now?

DPB: It never stops. It keeps on moving. That's why there are these big blockbusters in applications. Apple continued to grow. Now we have Google, we have Facebook, we have Twitter. If you look at a lot of these heavyweights in this next layer of companies in the Internet, they're still there. And then we have BioSpace, Health Sciences. It's a weird place, frankly.

Now, what comes with that dedication to be successful? It has the highest divorce rate in the US, maybe even in the whole world. That's a casualty (laughs).

SCB: What's the future of technology?

DPB: It's endless. We've hardly tapped the capability of the human brain. If we can only approach one-billionth of the capacity of our brains, that would be an incredible supercomputer. We have a successful company that we funded, and the engineer who went to CalTech did research in mimicking the human cochlea. If you have a Samsung phone, when you're talking to someone, let's say you're in a very noisy intersection, whoever is receiving your call will hear that noise. With that chip in the phone, you will hear only the voice. The noise is taken away. That's because he modeled it after the human cochlea. He mimicked the brain in separating the noise from where the main source is, separating the noise from the real voice. That's hard to do.

It's a very good design that we will probably spend another thousand years before we can come close to its ability. But if we can do that, it's kind of scary (laughs)! Then we won't need computers, we'll just compute naturally. Microelectronics should be there too, to solve that problem.