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**Dr. Nii Quaynor, Chairman, Network Computer Systems and
Ghana Dot Com**

Interviewed by Henry McGee, Senior Lecturer,
Harvard Business School

January 15, 2014 in Accra, Ghana

Audio interview conducted in English

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Baker Library Historical Collections
Baker Library | Bloomberg Center
Harvard Business School
Boston, MA 02163
617.495.6411
histcollref@hbs.edu
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HM: *When I think about the Internet, it's really made us all global citizens and as a member of the Internet Hall of Fame, you certainly are a man of the world. You were born in Ghana in 1949, just six years after independence, and, as a teenager, you decided to leave your country and travel to the U.S. for your education. Can you talk to me about that decision; was that something that was encouraged by your family?*

NQ: My father encouraged me to do that, and one of my brothers also did encourage me. But it was not obvious to my father until he went with me to the U.S. Embassy to investigate what it took to get the visa for the kind of scholarship I had to go to Dartmouth. The consular then was someone who was also a Dartmouth alumnus and that came in very handy because he, within minutes, convinced my father, who is of a relatively disciplinarian nature, that I could not have had a better choice than Dartmouth, and so he happily supported me to go.

HM: *Tell me about your parents. I know you were born in Ghana, but where in Ghana were you born? Tell me a bit about your family and your father.*

NQ: OK, we are Ga and we are from the Greater Accra region, so you are in our home. We're all tenants, including the government. My father was a civil servant, career civil servant, and my mother was a homemaker, you might say housewife, and she had about nine children, of which seven survived, but we are only left with four right now. That was the nature of the family, mostly male and one female, and all of them attained very high levels of education.

HM: *Encouraged by your father?*

NQ: Yes.

HM: *And your mother, of course.*

NQ: Yes. Yes. As it turns out, my father had a chance to go to Tuskegee University.

HM: *Did he go?*

NQ: He didn't and that gave him the resolve to make sure that all his children were going to achieve what they wanted to.

HM: *Right. Why wasn't he able to go?*

NQ: I think it was financial and scholarship type of difficulties so he swore to himself that all his children will have the opportunity to go to university, no matter what, and he accomplished that.

HM: *Did he complete university here? How far was his education?*

NQ: No, he didn't complete university. He finished the equivalent of a school certificate, which is like the old form of secondary school, and then he went into the civil service, so most of his education is from civil service certifications, exams, and so on.

HM: *Right. Now were you the oldest son or the middle?*

NQ: Oh, no. I was the youngest boy.

HM: *Youngest? OK.*

NQ: Yes, the girl was after me, so I'm the sixth in the family.

HM: *Did being the youngest boy affect you in any way?*

NQ: Yes, it affected me significantly, perhaps more so during my maturity periods than in my early days. In the early days it was oppressive. Everything was handed down. Everything was disciplinarian. It's not only my father who could discipline me; any one of my elder brothers could discipline me.

HM: *So you had six fathers?*

NQ: I had six fathers and some uncles and other things, all taking care of me to make sure that I stayed within the boundaries that had been defined. Towards the middle part of my upbringing, I began to see a difference, in the sense that I had available so much material, old knowledge, books, everything; that I could, on vacation, have textbooks to prepare for the next year, even though I hadn't been to school yet to find the books.

HM: *So that gave you an advantage?*

NQ: Yes, I certainly got an advantage. Having the example of brothers who are eye surgeons and forestry leaders and so on, highway engineers, trained in all of that, I began to feel motivated, meaning I could see that perhaps I may have a very good chance as well.

HM: *Now, were you the first one to decide to go to the U.S. for your education?*

NQ: No, I'm the last one.

HM: *So tell me about that.*

NQ: Yes, our first brother, he's passed away, he was an eye surgeon. He was trained at, I think it was Michigan, Ann Arbor, and then Rochester, but he did his work at Henry Ford Hospital in Detroit. So he was, of course, the first of us to go to the U.S. and he did so very early. Then there was the one who went to Ann Arbor also, but he was in wood technology, forestry, and then there was another who was in civil engineering, highways, but he was mostly trained here and in Australia. Then there is a dentist who was also trained in the U.S. and he went to Wayne State University in Detroit and Nashville, but he works now in St. Louis. You can see the list.

HM: *So, how did you end up at Dartmouth?*

NQ: OK, maybe in my case it was a bit of a chance. Around that time there was a well-known program called ASPAU.

HM: *Right. What does that stand for?*

NQ: I don't recall the acronym, but it's one of these USAID programs; it was organized by the African American Institute and it had a Latin American version called LASPAU. Now the idea was to get leading young students with potential to the U.S. as a method of improving, perhaps, our appreciation of the style of governance of the U.S. I didn't participate because I had just transferred from Adisadel College, in Cape Coast, to Achimota School and that is when I learned about the process. Even though some folks were going to ASPAU from Adisadel, I wasn't exposed.

HM: *What was the name of that school?*

NQ: Adisadel College. It is a secondary school in Cape Coast, but here secondary school—we used to do it in two parts: the first part is five years, and then the last part is two years. We call it the sixth form. So you're allowed to shift school after the first five, and I shifted to Achimota School.

I just happened to—because it was my age group that had been evaluated to go. I was not decided. I might not have heard of it then but, because I was here, this is where I learned it. But I felt it was a bit late for me to prepare for it because there were some exams and so on, so I let it go; I didn't partake, but I knew the universities that were involved. Meaning, I knew this colleague of mine was trying to go to Columbia. A former friend of mine went to Columbia, another went to Lehigh, and so on. So I knew the Ivy League schools that were involved. Anyway, I finished the sixth form and went to the University of Ghana to do medicine.

While I was there, in a way it became evident to me I did not like to do medicine and so I decided I would rather go and do engineering. So I wrote to three schools. One was Dartmouth, one was Ann Arbor, and I forgot the third one, Canadian, Toronto or something of that sort, and I got what I consider a good opportunity from Dartmouth. It was not a full scholarship but it covered the tuition and a method for accommodation, meaning, you had to work for your meals and things like that. So I thought it was reasonable and that is how I ended up there.

HM: *And what year did you arrive?*

NQ: 1969. September '69.

HM: *At that time there was a great deal of unrest on campuses. African-American students were concerned about the low numbers of both students and faculty. What was it like? Tell me about that and how that shaped your decision to come to the U.S., given everything that was going on in the late '60s and early '70s. How did that affect you?*

NQ: Well, we were all embroiled in it, because at that time at Dartmouth there was just a handful of Africans or African-Americans or people of color, very few. So we could appreciate the need and what the turmoil was about. On the other hand, we were also not exactly emotionally involved in that process, because our emotional process is in Ghana, so we were more

sympathetic and supportive because we could appreciate the concurrence of the goal. We were not exactly parties to it.

There were more foreign students than Americans and there's a big distinction, because we came on foreign aid, foreign assistance, moved in foreign student circles and we lived in the foreign student homes. We did not live in Afro-American, let's say, dormitories. We were really classified as foreigners and we lived and behaved as such. We followed the work permit requirements as foreign students. Therefore we could not exactly participate at the same level, although we confronted and knew the problems probably even more than the African-Americans, because, on vacation, when everybody leaves town except the foreign students, that's when you understand. Everybody is gone and you are alone and you are just a handful of Africans. You can then understand what it means to be alone in a very crowded place, so to speak.

So that's the way I reacted to that. We were very supportive and, not only that, we participated in the issues of some of the freedom movements that were going on, the SDS type of things. We also participated in the Mandela-related type of things, then also Luther King, Malcolm X, and all these things. We were embroiled in it.

HM: *So you had your four years there, and you've talked a little bit about your experiences there, but you decided to stay on and do graduate work?*

NQ: Yes.

HM: *Did you come back at all or did you go directly to graduate school?*

NQ: No, I went straight to school. The plan in my family is you go to school until you are finished with school and then you go and work. Later, if you want, you can study as you work, but there's a period of schooling and I cannot change it. So I went to school continuously until '77, when I finished my graduate work at State University of New York, Stony Brook. So, from Dartmouth, I went straight to graduate school on Long Island and I stayed there until it was over.

HM: *Now at what point did you decide that you wanted a Ph.D. because, while there are medical doctors and engineers and others in your family, you were the first one to get a doctorate. That's a big step. When did you decide to do that?*

NQ: I think you can imagine... I was an ace mathematician and an ace physicist but I went to medical school because someone convinced me to do medicine. I recognized I didn't like to play with blood. I didn't enjoy cutting the animals and so on, so you could see I would swing from the biological sciences to my strength, which was in the physical sciences. So when I left here, I knew I was not going to do medicine. I was not going to do anything related to biological sciences. I was going to be in engineering fields. So when I graduated, it became evident that I was blessed with

something. I was writing programs that professors thought were not easy, were not possible. I remember taking courses and then being made to take my solution and adapt it for the university's use.

HM: *Really?*

NQ: Yes.

HM: *You were majoring in engineering. Did you switch to computer science, or what happened?*

NQ: At Dartmouth, this is how it works: the first degree is liberal arts, so there is nothing like computer science or anything, but we had engineering science at the Thayer School of Engineering. At Dartmouth, you could major in engineering science. So instead of doing physics and crossing later, I did engineering science. I got exposed to electronics but I also got exposed to civil engineering. I also got exposed to all manner of things that makes an engineering scientist—meaning I got a good base of engineering, even economics and so on. That was the arts program... that you must be liberal arts and, yes, you can have a major and so on, so my major was engineering science. Through that, I took most of the computer courses that were available.

HM: *This is early days?*

NQ: Very early. Very, very early.

HM: *And so what attracted you, because this is going to obviously play an important part in the rest of your life?*

NQ: Yes.

HM: *What was it about the computer? This is in...?*

NQ: 1969, '70. Well, OK. I go and take my first course in physics and I'm very good with physics. I've got A here in sixth form, A level. I go and take my physics and the first physics course, I remember I even got advanced placement. I took the exams and I got advanced placement. So I go in and take my first physics course, which is not the normal first physics course but some special physics course, and I'm given an assignment to go to the computer lab, which was at the computer center, and attached to every terminal there was a plotter. So my assignment was to plot the trajectory of a stone that you've thrown of a certain weight, of a certain force, and then show does it go like this? Like that? And so on.

Now I was very fascinated, having this big thing. I don't know what it is, in a glass door with lots of people hanging around it, doing all sorts of things. I was fascinated. So after the project, I began just hanging around there and I got myself a job as a cleaner to clean the paper from the

terminals. Then I got a job as a terminal room assistant, to sit there and help people who wanted to find out games on the system or various anthropology tools that we have or whatever, economics, what have you. So I got myself a job there and that means I was constantly around it. I was reading, I was learning. I was trying everything. That is when my resolve to go in that area deepened, especially as my courses were showing some proficiency of recognition. So when I left the first degree—actually it was two: Bachelor of Arts and Bachelor of Engineering.

HM: *What was your Bachelor of Arts in?*

NQ: Engineering science. The other one is engineering, just engineering. When I left there, I was actually driven out of there.

HM: *What do you mean?*

NQ: Because Dartmouth said I had taken all the computer courses, so I should go somewhere else and get a different experience. So, literally, even though I was qualified to do my Ph.D. there, they drove me out. They said I should rather go somewhere else and get a different experience. I could appreciate that but it was easier for me to stay there; I already had ways of managing and I had lots of thesis projects I could do that would be impactful, but I was advised to go.

That is why I went to State University of New York. I could have gone to Vanderbilt also. I could have gone to Georgia Tech, but State University of New York seemed attractive. So to answer you, I decided during my early days that I was happy with this, especially coming off of you might say a failure, a disappointment, in medicine. I saw something, then I said, “Ah, I can do this. Ah, I like this. Ah, it’s good. It’s fun. It keeps me interested.” So that was like a divorce and then you find a good match. (Laughs.)

HM: *Now you’re a Ph.D., an undergraduate degree in engineering, the Ph.D. is in computer science?*

NQ: Computer science. When I went to Stony Brook, professors there also acknowledged some unusual skills. They believed they were coming from Dartmouth. They said, “the Dartmouth guy’s unusual skills,” that was how they recognized it. However, I decided to work myself, progressively. So I did a Master’s there before I did a Ph.D. It wasn’t straightforward. I remember I tried to get advanced candidacy; I didn’t make it. I was frustrated. I almost left to go to the University of Toronto, but I was convinced to stay on by professors and colleagues.

Indeed, the next time around I passed and I got myself a good thesis area, which was in the security area; it was a famous problem called confinement, meaning information flow security. So, if something is confidential, if you combine it with everything else, it’s just to remain

confidential. How do you build a machine or, in today's terms, program an environment that will enforce these things so that you cannot devalue or declassify classified information or leak it through covert channels. As you use it in computations and so on and so forth.

There's a story here which I need to echo. Now my thesis advisor always wanted to steer me towards things which were applied and so, when he saw a thesis subject that I was doing well in, he always tried to pull me back to be more applied. The same way when I was at Dartmouth, one of the inventors of BASIC, [Thomas] Kurtz, kept on telling me that whatever I do should be more applied because it can be more beneficial to my people. So when I went to graduate school and I heard the same thing, even when it was painful, I accepted it. So for instance, this security project, even though I got some references out of it, he told me, it's getting too theoretical. Move off it. I was upset, but he went on a sabbatical, so it gave me time to build a new thesis area, which is what led me to the distributed systems which were the ancestors of the Internet.

HM: *After you got your Ph.D., you stayed in the U.S. for a couple of years.*

NQ: Yes.

HM: *Tell me about it.*

NQ: OK, when I left Stony Brook with my Ph.D., I had two main offers. One was at IBM, Yorktown Heights, and one was at Digital Equipment Corporation.

Now I evaluated the two and I thought that Digital was a better alignment for my future than IBM was. And my agenda was simply that IBM was already very well established and so on and so forth, but Digital was not so well established, yet I could see they had a lot of talent in there. So I opted to go to Digital and work in their research department, R&D department, and to develop some of my distributed systems research work, and that was the case.

HM: *What town was that in?*

NQ: The time was '77, in Massachusetts. I started in Maynard, the head office. I was in R&D there and then several years later I was in Marlborough, but I spent more time in Marlborough than I spent anywhere else while at Digital.

HM: *Not far from Harvard.*

NQ: Yes.

HM: *Now while you're in the States, you've gone to Dartmouth. You've got your Ph.D. You've gone from very theoretical considerations to very*

practical things. You're working at Digital in a field you love yet, back in your country, there are things going on, and in 1978 there is a coup and Jerry Rawlings comes in. You return a year after he comes to power. Can you talk to me about that. What was going on in that '78, '79, that period, and what led you to come back then?

NQ: OK. I believe around that time my father was retired or about to retire. I came back to Ghana in '79 because I was attracted to contributing to society. The change in government, it was an interesting thing for me but, at the same time, it also coincided with the requirement that I had for visa purposes. I was on a J visa, here on a J visa: exchange visa, they used to call it; you could only stay up to two years to get practical experience, so I had finished my practical experience and so for me the timing was, let me return and then I'll figure out what happens thereafter. So it's a combination of, I can try and fight it and stay versus, why don't I go and contribute? Why don't you go and contribute and then, after that, figure out what it is that you want to do?

HM: *So it's a coincidence with the new government?*

NQ: The new government was exciting for me. I thought, look, the government is social, democratic, doing a lot of mass mobilization of people to do things. I could also make an impact by making sure that this knowledge is not lost here. I've always had a concern about developing

countries being left out of this industry in particular, so you might see, in my later life, I spent a lot of time addressing those needs, especially for scientists. So it's the combination of these two things and also I worked out a very good opportunity at Cape Coast University.

HM: *It was a good opportunity there?*

NQ: Yes. I had made up my mind I was coming, at least for a short while—so I organized for me to be sent to the University of Cape Coast.

HM: *Now traditionally they had been a school that turned out teachers; the focus was on turning out other teachers.*

NQ: Correct.

HM: *Had that changed by the time you got there?*

NQ: No, we were the ones who went to change that.

HM: *You changed that? OK. So that began in '79, '80?*

NQ: Yes, around that time. We were the ones who were driving for the change. You know, my options were very simple. They said only two other universities had the semblance of a department. One was at the University

of Ghana but, in my opinion—it was being headed by an electrical engineer; that's not computing for me. And then the one at UST was being headed by mathematicians; that was not computer science for me either. So, even though I had a relationship with University of Science and Technology, I opted to go to the third university, which did not have anything, just so that I could plant what I consider pure computer science school of thought, meaning the opportunity to have a clean slate, not going to adapt somebody's soul of a department, but to have a chance to lay down fresh disciplines of computer science. It was very exciting for me.

HM: *So talk to me about the challenges you faced, because you said the university is changing, there's a new government. Computers were relatively new. You had to attract students. You had to attract funding. Talk to me about the challenges of setting up that department.*

NQ: OK, well, the university had some computers, ICL card-based computers, and it was being used mostly for administration, things like payroll, I imagine, and so on, or some other services. So I decided to use it for teaching. My goal was why don't I get students to be using it for their projects, for their exercises?

HM: *Did they put up any resistance to that?*

NQ: Actually no. It was very straightforward, because I'd been hired to be both a lecturer in physics and a lecturer in mathematics. So, even in my lecture, I have to teach students, and if you have such a hot [skill]—if I stayed in the U.S., it was really valuable to have such a ready technical resource, you must be given teaching assignments. In mathematics I was given a teaching assignment. I negotiated my teaching assignment to be computer science courses. So, I ended up taking two sets of mathematics students from their third year and giving them a dose of at least the six disciplines of computing science that I could identify at the time.

HM: *Now were you the first person to teach computer science in Ghana?*

NQ: Yes. Yes. I mean, they were teaching computing or engineering or physics or mathematics at the time but I was teaching pure computer science, yes.

HM: *So the very first?*

NQ: Very, very first, because they did not know what operating systems were. They did not know what compilers were, programming language compiler. They couldn't have known, but here was somebody who has built them, who has the tool kits for teaching students.

HM: *And when you went to these mathematics students and others who you talked to, what did they think about majoring in this new thing called computer science?*

NQ: My approach was, first I had to go to them, so they are mathematicians. I teach numerical analysis to capture them. And then I find the next thing that's close, programming languages. They know about it. They can learn about the grammars. So I had to create a process for them, which they were very excited about; by the time they go to data bases and those things, they were in heaven, because they had seen the progression. So it was deliberately planned in that fashion for them, to engage them. In fact, one of them became the head of the department of computer science at University of Cape Coast for years.

HM: *You must be very proud of that.*

NQ: He's just retired actually. Yes.

HM: *So you come back to Ghana, you start the department, you take advantage of the resources, the computer, when the school's not using it. Time goes along, and in 1988, while people have been trying to push you to do something practical your whole life, you really decide to do something practical and you launch your new company. Tell me about that.*

NQ: Correct. Most of my things are deliberate and planned. This first one was coming to build a workforce. It's all planned. I came to build a workforce at University of Cape Coast by training students. Those students grew to become part of the workforce, so my plan was—if I went, who would I have to work with me?

HM: *So, even when you came here back in '79, you thought you were going to set up a company?*

NQ: Eventually. Meaning that I knew I wanted to move things in Ghana because I was concerned with the digital divide. I was really very concerned because, around those days, there were very few even Asians among our class and I knew the problem, so I wanted to go back and help the developing countries. So in my second coming—meaning, I came to build—start the process of building peer workforce and then I went back. You see, I went back to the U.S. in 1982. Back to Digital.

HM: *How long were you there?*

NQ: When I went back in '82, I stayed there until around '88, '89.

HM: *That's very, very important. So just to trace that, because people are going to be writing about you for years. You got your Ph.D.*

NQ: Yes.

HM: *You worked for two years at Digital.*

NQ: Yes.

HM: *There was a change—there were visa issues, but also there was exciting change in Ghanaian society that you wanted to become a part of.*

NQ: Yes. Yes.

HM: *You then come here. You've always been concerned about the digital divide, but you understand that there is a workforce issue, so you get the program set up.*

NQ: Correct.

HM: *You get it going and then you go back to Digital for a couple of years.*

NQ: Yes. I returned around '88, '89. That's when the company got formed.

HM: *So you came back knowing that, as soon as you got back, you were going to start the company.*

NQ: Oh, yes. In fact, the second trip was actually very deliberate because I retired from Digital in '92. Now between '89 and '92, this is what was going on: I had learned from the first trip that you don't just come; if you come, you're not going to go very far. So I had arranged the program by which I spent time here and I spent time in the U.S. over an extended period of time, two years. What was the program? I made it clear I was about to leave but they determined I was too critical to leave, because I had a huge staff of over sixty scientists—thirty of them Ph.D.s or so—working for me in the research department there. So the arrangement I made was that, OK, I can keep managing these fellows but I'll work part-time.

HM: *So you knew when you were in Ghana—I just want to be clear—you still had a relationship with Digital while you were here.*

NQ: Yes. I never cut my relationship with anybody. These were my friends so, we're all here in research together, sacrificing for each other. So anyway, it got to the point where I decided I wanted to return. When I came to Ghana the first time around, I took a leave of absence. Then I went back and got into the research of building machines. I did my bit of verification and I became responsible for performance modeling management,

benchmarking, all those things. I used to write programs to test new CPUs and so on, so I was doing my thing.

Then, along the way, I made it clear that I wished to return at some point to my country but the management did not want me to leave. They said I was playing a critical role for Digital at that time. And I had very difficult management assignments of three different groupings: performance, reliability, and functionality and so on—managing twenty, thirty Ph.D.s. There wasn't anybody they thought who could replace me, without other groups splitting apart. So we made an arrangement that I'll work part-time. So I used to spend my time and my money—every month I'm in Ghana two weeks. I'm in the U.S. two weeks. I'm in Ghana two weeks. I'm in the U.S. two weeks. What did I learn?

The first time I came, I realized that I needed more continuous engagement with my base, which was in the U.S., and I didn't have it. So the second time I wanted to make sure I had that continuity. So when the management said I could not go, I worked out this arrangement, which would allow me for a two-year period or so to be resident in both places. It was tedious, but that meant that when I came, I could see my development—or if there are some needs—sometimes it's advice, sometimes it's technical, sometimes it's facilities, equipment—so, when I go to the U.S., I could try and resolve them. This was happening every month, so you can see the gearing up was very high. I was getting a lot of support from the U.S., but also building a support base here. That is how that company was formed in 1988.

HM: *So, in terms of developing the products and the information and so on that you needed to start the business, were there any things in your time working for a very large U.S. company at that time that would later be of any use to you at all in running your own business?*

NQ: Oh, yes. Sure. Notice that the first product that was the flagship of Network Computer Systems was Digital Equipment products. So coming back, I worked through the process for NCS to eventually become a distributor of DEC equipment in Ghana, so NCS introduced DEC equipment to Ghana.

HM: *That was its first business?*

NQ: First business that it started was, you might say, enterprise equipment, maintenance, and services for these companies and so on. That was a very good business, a system integration business.

HM: *But what about how to run a business? Did you pick up anything at Digital?*

NQ: Plenty. I was very senior. I was a senior consulting engineer equivalent, but I was a senior engineer and manager, because I didn't want to be alone contributing. At some point the vice president, Bob Glorioso,

convinced me that there was also interest—I didn't set out to be a manager. I was trained to be a pure engineer scientist, practical type: programmer, hardware builder, that kind. I guess I enjoy doing that. But as the projects and performance systems were being churned out, the vice president noticed that people were coming to me. Each time he came looking to talk to me, he would see either somebody in there or somebody waiting to see me and he said if my job is just as an individual contributor, so why is it that people are so anxious to spend time with me? That means they are getting some value, otherwise they would not come.

So he asked me would I like to manage a group? I said, "No, let me just do my work," but he said, what about this person he saw, who was asking about when I would create a benchmark for this. So he said, "Then you are managing." I said, "Well, no, no. I'm happy—look, I'm an African, I don't want to get involved in this human politics thing," I said, "Let me just do my work." He left me for two years, then he came back again and said, "You are not going to refuse this time; you're going to do it." I said, "OK, I'll do it." So they transferred four people to me, which I grew to the sixty-something people before I left.

HM: *All right. So you learned to manage a large operation. Did they give you special coaching or training?*

NQ: Oh, yes. There are workshops, courses here and there that we had to go through, but you see, that guy is counting on something. He has seen

something. He has seen someone who is an individual, doing his work, but also helping others. From his point of view, that's what a manager would do.

HM: *Right. So by the time you decide to start your own company, you've had several years of experience managing substantial units in a Fortune 500 company, right? So you were coming at this new entrepreneurial venture having had business experience.*

NQ: Precisely. Exposure, which I know if you have it, you probably want to take it out, you know what you've got to do. If you want to build a new product, you've seen it done. I had plans. I participated in developing them, so it seemed like this was trivial.

HM: *All right, so it seems to me it's one thing to have all this knowledge. You've seen how Digital rolls—how they develop equipment, how they market to other businesses. You've seen every aspect of the business, yet you come to Ghana. You decide to launch your own business. But there are all sorts of issues any entrepreneur faces: cash flow. Does Digital help you, because you're bringing the equipment over? Do you pay them in advance? How does that work? No one was giving you a loan?*

NQ: Correct. I took a different tack. The tack was I will spend upfront on presales, meaning I will send my people into town, I'll prepare

documentation for them, I will organize my own workshops, Because I'm building the business. Yes, it's out of my pocket to at least do the presales. But the agreement I had was very good in the sense that, once I made a sale, I got good commission. At that time, the commission for sales was 30 percent. This was before the PCs came and balanced the market. These are big machines so, with the machines \$100,000 earning, the commission was \$30,000. It was something of that nature that we started with. I think the first order was around \$200,000 and we made money. What did I use the money for? To train my lead two engineers. The money was spent to send them to Reading, U.K., for training.

HM: *So you invested the money back into the company?*

NQ: Immediately, because I know I can do it, because I've been in DEC for so long. But I'm not around all the time, so I wanted to make copies of myself. So I took fresh guys from the universities. One is a software guy. One is a electrical engineering guy—prepare them and send them off for training to the U.K. for several months.

HM: *Now three years later, which is very quick, at thirty-six months, it's gone from a part-time job for you to a full-time job for you. I don't know if you can recall but how big was the company then? Were you nervous? This is a very new company now.*

NQ: Yes, but the thing is, we knew everything we're doing is in the right direction, and that technology is going to come. Whether Ghana likes it or not, technology will come so, if we have the expertise, then when the technology comes, they will come to us. So our whole goal was to be the leadership in expertise—leadership, not in terms of Africa, but in terms of the global world. So I have people that I have trained that could match everybody everywhere. That is the reason why we got the Internet actually. We were using DECnet and all these things already. We knew networks. We already had a network spanning from Accra to Tema on our own, doing DECnet, connecting our enterprises.

HM: *Let's actually talk about the first company. You started off in sales and you were earning some nice commissions.*

NQ: Yes. Sales and maintenance.

HM: *So that adds to the business. That's the initial business plan, doing sales and maintenance.*

NQ: Correct, and that was the bigger portion of our business.

HM: *OK, so tell me about how that business expanded, because you're saying now you had to set up a network.*

NQ: OK, that business expanded very rapidly. It started from the energy sector, because they were using a lot of Digital machines at that time, so Petroleum Corporation, then went to the power company, VRA [Volta River Authority], and then we spread. So that one was a very successful business.

HM: *And you didn't have any resistance? Tell me about the selling process.*

NQ: Our selling process is one of: First you have to push education, because the people you are selling to don't know, they don't understand, but they can read. So for a long time we're pushing different kinds of products, just so that you become familiar with them, with newsletters and brochures and so on, and we would do that for years. Every month we are sending something. Every month we are sending something new. Soon somebody starts following up on the places we've been sending the things to: just have a chat, introduce ourselves, and follow-up, that kind of thing. Remember there were no tenders and things then. We've advanced. It's only in the last maybe eight to ten years that bids have come into being. We haven't started up the bids for this one also.

The reason why I keep switching is that we very quickly recognized that the equipment business has a long sale cycle. Of course the commission is very good, but the sale cycle is eighteen months to get a good one. So you don't want to spend all your energies upfront because

you'll die before somebody else will take the deal, so you need to pace yourself in that process. We sold mostly in the oil sector and then we began to expand to other sectors as well. We were very fine with government. That was during the Rawlings era, second time: democratic era. And so it was OK. It was a lot of work, because of the eighteen-month sale cycle.

Now what we discovered when we were involved in some bids—and we won some and we lost some, but what we noticed is that there's too much lobbying. And then also we had a very good partner. Things like bank guarantees, meaning if you do a bid, you are supposed to guarantee that you can do the job, so they usually charge you 5 percent, 10 percent. That was also a major hurdle, but we were lucky because of our relationship with Digital; Digital, on occasions, issued the bank guarantees for us.

HM: *Really? So that connection to the U.S. company gave you a competitive advantage?*

NQ: Significant competitive advantage, because this was a barrier. When you go to a bank here looking for a bank guarantee of \$100,000—just \$100,000—you pay \$100,000 to the bank, but you are submitting a bid for \$500,000 or \$250,000. If you had it, you would just supply the equipment wouldn't you? OK. So it's a problem with our banking system then, and even now. But we had that advantage of working with Digital; they were based in France, CDG, and we knew them very well, and they participated

in our presales process. When they got leads, they sent the leads to us, like World Bank-related tenders, they heard it a little bit earlier than we did, and then we used that knowledge. So there was definitely an advantage in having a partner like Digital for this.

HM: *And at this point do you have any other outside investors?*

NQ: No, most of these things were myself and employees. No outside investors. The employees all had percentage shares of this company. It was like a family thing, a community, and we were hoping that in the future we may make a lot of money, which didn't happen.

HM: *Now while all this is going on, you leave the university to run the new company, NCS, full-time. Tell me what else is going on in 1991 and as the Internet is launched. So in 1991, you're reading about the Internet. You've heard about it.*

NQ: Well, the thing is, I knew about the Internet long before because I was in graduate school there, so we were working on National Science Foundation projects, I knew about ARPANET. One of my colleagues had gone to work with ARPA and BBN—Bolt, Beranek and Newman. BBN, they were making one of the IMPs, part of the equipment for the ARPANET in the early days. So I was very familiar. I had read [Vint] Cerf and [Bob] Kahn, the famous paper about TCP/IP, the internetwork thing, so

we were very familiar. The only thing is it had not gone commercial, right? The Internet had not gone commercial until around '91, thereabouts.

What we were using was DECnet. We were connecting all of our DEC facilities together using DECnet and that was our selling point. So, for instance, I was telling everybody, look, you manage the sector, there's VRA, there's GNPC [Ghana National Petroleum Corporation], you can send documents among yourselves. So as new organizations came, we connected them. That was a selling point. We knew that the network is the computer. We knew that. From DEC we knew that.

So that is what we were pushing, that the system is what you sell. Not the individual component. So when we sell you a system, it includes networking of your whole campus and then we offer you that you can interconnect with these others to exchange mail. Sometimes it's useful and GNPC and VRA, they agree to do those things and we move on from there.

HM: *Right. So the business continues to grow quickly?*

NQ: Very quickly.

HM: *Businesses in Ghana realize the value of buying computers, of networking the computers. As a result, both of your educations is a selling point.*

NQ: Correct. And you have circumstances—you know, if I had gone with Data General, I may not have had the DECnet, you understand? So many, many circumstances contributed.

HM: *And it turned out they were a very financially beneficial partner to you.*

NQ: Correct.

HM: *So you didn't need to go out and get bank loans?*

NQ: No, no, I didn't have to get bank guarantee. Of course, bank guarantee is not money they are spending. They may spend only on the charge on it. Because you don't take money from your pockets to pay but, because they have lots of money in the bank, they can guarantee it, meaning that if something goes bad—they know nothing will go bad, that's why they do it. So it's not a major risk, but you need an institution with enough muscle to go to raise a bank guarantee of a certain volume. So that was an advantage.

HM: *So the Web begins to go commercial in '91 and then five years later, in 1996, you make a decision with how you're going to expand your business. Tell me about that.*

NQ: OK, there were a number of forces around that time, some of them potentially destructive because of how people were thinking about them. You remember the mini was then on the rise, but people thought PCs were going to do the job of minis? And some of that came from the World Bank community, meaning that the impression was created that the advent of the PC meant that the problems of the poor are solved: there is no need for big machines that are very expensive; now you have many small machines, so it's going to solve all your problems. But that was having an impact on sales of enterprise systems because people mistakenly thought that, oh, if I give everybody a PC, then I'll solve my problem, forgetting that the server issue will come up again. So there was a paradigm shift that was going on but was not well understood, and it was beginning to impact.

HM: *Your sales were being challenged?*

NQ: Yes, sales were being challenged, because when you go to somebody, he says, we charge money for maintenance, annual fee for maintenance—why do you still maintain this when we have PCs? So why don't we just use the PC and stop using this server, maybe for power simulation? We kept saying that the PC can only handle a small grid. Meaning that there's a limitation on what a PC can do. I'm not saying it cannot do some but, if you really want to do it, then you should be getting machines which are bigger and bigger. Then you can do it for the whole nation, but that misunderstanding did impact the growth of that business.

HM: *Were your sales results affected to the point where you were concerned or had to lay off people?*

NQ: Oh, no. We were growing. We were growing. We didn't have problems. As one looking at the thing, we knew that this was impacting and we had to repel it. And we thought of two things. One is education, that PCs help with but they don't solve the server problem because, if you all have PCs, eventually you have to talk through something. Have to leave a document somewhere for somebody. So they missed that.

The second thing was where the Internet came in. We said, ah, if they all have PCs, then there must be a service we can offer to them, which turned out to be the Internet, you see? So around that time, we were concerned about the impact of the PCs and how to evolve our business to the next level. We were still maintaining our equipment business. In fact, by that time we had already added Sun Microsystems, we had added Cisco, a few others, so now we could supply you everything you needed for your enterprise. But we were still concerned. What impact would PCs have, especially if the World Bank is behind pushing PCs?

So we had to say that, well, you have to educate that a PC will do a lot but it doesn't do everything. So the rest is where we were focusing on, because PCs at that time, margins were not very good. That's why it ruins the business. Margins were like 10 percent, not 30 percent, so it was going to be ruining the business if you think you should replace everything and

put PCs there. So we had the defense that PCs are useful as front ends, but there's something at the back: we call it a server, and it's the same as what you already have. This was the message to address it but then deep down we were thinking, what do we offer these PCs, because they will come, and that was a challenge between, you might say, '91 and '93. So we're concerned and thinking about it. So as we saw the Internet going commercial, we began putting our effort on the Internet and in '93 we attained full connectivity. By '96 we had changed our thing to all satellite-based IP for connectivity, with higher and higher bandwidth 6 Mbps, and so on and so forth.

***HM:** Again, from a business perspective, what were some of the challenges that you faced? Did you have to bring more capital into the company?*

NQ: Oh, no. You see, I took the view that in a faraway place like Ghana, if you put in capital, the person will build a house of employees. He will just fill the ground. Their feet will not go all the way to the ground. But it's easier to seed it and grow it. When you see there's a leaf suffering, you spray it. If you see it needs more branches, maybe you graft something. It was an approach of growing a business then building an institution. I didn't go looking for the best routing geeks I could find or the best programmers I could find, no. We had to grow them. We took on the view that you have to grow them, so even the transition to the Internet, you have to grow it. It has

to come from your earnings, so we had to move some of our earnings from the system integration business into buying the equipment, routers, and so on, and establishing a link to the U.K.

HM: *Right. So you bought all of that, so you said, we're going to connect Ghana to the rest of the world via the worldwide net. We're going to put our money into the servers and routers and so on, so you're sitting and you're making the cap. You obviously being an expert, you know all of the equipment. You know which routers you want.*

NQ: Correct. Or I can find out, but sometimes you talk to people and they tell you. (Laughs.)

HM: *You then take the money that Network Services is throwing off because you're nervous.*

NQ: Yes. We're concerned about the business.

HM: *But that's the equipment, right? But you still had a lot of decisions, right? You could have connected anywhere. How did you choose where to go and how to go?*

NQ: Remember at that time even the Telco [telephone company] did not know anything about the Internet and everybody was afraid of the Telco,

because the incumbent Telco is also the regulator. It's only in '96 that all these things are separated so, at that time—we're talking about '93—it was everything.

HM: *That was a real challenge for you.*

NQ: For me that was not the challenge. The challenge was the policies that came thereafter, and I will explain. You see, if you are generally in business, it's not too difficult for you to explain to the regulator what is good for him. This was the case: to convince Ghana telecom to allow me to take a lease line through them and drop it in the U.K. did not take any effort. I positioned the thing to the minister—two ministers—one happened to be an engineer who was one-time minister for transport and communication—and he handed it over to a teacher. But I had talked to both of them.

I said, "Look, I'm not doing anything unusual. It's like I'm running an office bureau, like one of those places you go and get your things typed, that's all I'm doing. I'll go to them and buy a wire from here all the way to the U.K., and then I put something on top. So they are making money. I pay them every month and then when I pass the things through it I charge these people and I pay the tax, so I'm not taking anybody's business. I'm actually building their business for them because I buy from them and I add something." The engineers say, oh, this is value added service. You probably don't even need a license. And then the thing became, why do I

need a license? I just go and buy dial-up lines that people can dial. I buy an international line from the same person to drop me in the U.K.: Pipex U.K. What regulation am I breaking?

HM: *Right. So they agreed to do that?*

NQ: They agreed.

HM: *At a reasonable rate?*

NQ: Oh, no, no, no. Same commercial rates. I used to pay \$7,500 a month for half circuit in Ghana here and then the other half I pay £5,000 per month for the U.K. end, so I was altogether paying this much per month, and I paid for several years.

HM: *And did you have to sign a long-term contract or you did it month to month?*

NQ: No, every month I paid. Every month I paid.

HM: *So now you shell out money for the routers. You're paying both in Ghana and London for the circuits. I'm seeing a lot of money go out the door and I'm not seeing it come in, so tell me about that.*

NQ: I'll show you. For instance, initially—and you will really understand the business—when we opened the business, we had only 100 customers. They were each paying \$100 a month.

HM: *Now were these individuals or companies?*

NQ: Some individuals, some embassies, some NGOs.

HM: *And they were paying \$100 per month.*

NQ: Yes.

HM: *That's still not enough.*

NQ: No, it's still not enough. My point is that at opening already I have covered nearly 80 percent of my biggest cost item, which is the line.

HM: *You sound like a fearless individual. Were you worried about getting those hundred customers or you sort of had them in your back pocket?*

NQ: No, no. They were ready. Many times the problem was where they are, they don't have good telephone line to come dial me and so on. Those were the issues. But, we come and survey. If your line is not one of these

wireless telephone lines and is a normal physical line and is in good condition, we will do it for you. So all I'm saying is that, by the time I opened the door, my biggest cost item is 80 percent covered. So by next month, it was already 200.

HM: *And it grew? So who signed on, where did the next set of customers come from?*

NQ: There is a paper somewhere on the ISOC, Internet Society, website that maybe we can find but, at that time, we actually studied the breakdown of the customers: where are they from? That is why I can tell you diplomatic and tell you embassies; I can tell you people from international organizations, NGOs, some government, like those doing foreign affairs and so on. And some who were running projects here with foreign partners. Let's say it's surveys. They are doing some work with a group from Canada. Canadians do good surveys, so they have some staff here—maybe one staff working with the surveyors to do the thing.

Now, don't you think that these surveyors need to communicate with the head office? The surveyor who is here helping the Ghanaians do the job, he needs to communicate with Canada. What was better than having the Internet at that time? So it changed their own cost structures and they start using telephones to send documents, install a modem dial up link to send documents, and so on. So the customers were ready. They were

actually there. It was a question of convincing them that it's worth the \$100 a month at that time.

HM: *And did you personally do the sales or did you have a sales force?*

NQ: Oh, at that time we had the Internet, we had about sixty employees. There was a dedicated sales force. There was a dedicated marketing team. There was a system integration team. There was a maintenance team. We were well established. They were leveraging on the existing infrastructure, on the human structure.

HM: *So do you recall what the revenue for the company was at that point when you started service?*

NQ: OK. I think at that time we may be between \$1 million and \$2 million.

HM: *So you buy the servers. You go to the Ghanaian telecom service and you have your first 100 customers and it begins to grow.*

NQ: Correct. OK, so by about—this was early '93—by about '95, you can imagine the users were choking the pipe because this leased line, truly I was paying an exorbitant price for. It was because of the speed, 9.6 KB per second.

HM: *Really?*

NQ: Yes. But this is what it takes to bring technology to a country. I had to bite it. There were countries like Nigeria where the operators refused to pay the same \$7,500 a month and I was sent by the UN, at least on two occasions, to sensitize these guys on what they were allowed to pay to start. But for me, we started and that is what made the difference. Because we have to start, and then manage the costs. When we realized that the line was getting choked—it was a very tiny line—then we invested in satellite dishes.

HM: *So this is '96?*

NQ: Before.

HM: '94?

NQ: It might be around '94. Yes. '94. We started with a small dish.

HM: *So then you have to lease satellite time?*

NQ: Yes, you lease satellite segment.

HM: *So again you're using your own cash flow. No outside money?*

NQ: No outside money.

HM: *And you buy your own satellite?*

NQ: Yes, you buy your own dish. (Laughs.)

HM: *Do you remember what that cost you?*

NQ: Oh, perhaps in the hundreds of thousands of dollars. But let me explain. You see, all of this technology is happening randomly. We contested for building satellites for some companies, satellite networks for some companies, like Ashanti Goldfields. They wanted to connect their mines so we bid in collaboration with a California company to provide it. In the process, I'm building capacity. So we did a project in which we earned very little, practically nothing, but in supporting somebody, first we learnt, then we were able to install our own. (Laughs.)

We were able, simply by sacrificing—instead of getting money—getting expertise—so we can turn it into making money for ourselves. And so we built our own satellite ourselves. That was a smaller dish. It was small, a 3.5 meter dish. This must have been around '94, '95. But then subsequently—we've gone from a leased line to 128 KB and then we went to 6 MB.

HM: *On the satellite?*

NQ: Yes. Oh, we replaced the satellite. (Laughs.) We put in a bigger, seven meter dish.

HM: *What kind of satellite was it?*

NQ: Andrew. We bought an Andrew satellite, a big one, in '96 because in '95 we had done software for an export job to the U.S. I had engineers in the U.S. writing software, Smalltalk, programming for some colleagues of mine in Massachusetts. So our earnings from that—you see how you dovetail it—our earnings from that, a piece of it went into buying the biggest satellite I could, to lower my costs.

HM: *Generally, in the literature, the sense is that you introduced the country to the World Wide Web in '96 and that's really when you went on the new satellite.*

NQ: No, but I started much earlier. They know. The world knows. Because a long way back, there used to be a proof that was checking all the machines and they know from '94 on we were there, but I've given the progression. In '93 we used a lease line. I pay that much. It didn't show up in the international literature. Then we went in '95, 128 KB on our satellite,

so we've gone from using the Telco satellite to having our own satellite. Look at the policy shift. And it took effort to do that. It was simply because I convinced them—I said I'm going to buy equipment and give it to Telco so you'll run it for me as long as I can pass through.

HM: *You did that?*

NQ: Yes. I gave it to them. I said all I want is to pass through.

HM: *And why did you give it to them?*

NQ: It was a method of negotiation. I just want to pass. If they say they won't allow me to. I say, "Give me a bigger bandwidth." They say, "We can't." "Here is the thing that will give me bigger bandwidth. Can you put it in your programs you'll see it and I just pass through?" And they said, "Oh, no, no, that's not how you do it." And that was the breakthrough in the satellite era, you see? Because they couldn't really give me more bandwidth, you see? So I had to show them a way to do it and then they said, "No, but that's bypassing us," and I said, "I'm not bypassing you. I give it to you. I just want to pass through it." Then they themselves talked through it and they said, "No, it's better you do it yourself and pay a fee," so that's what happened.

HM: *We'll talk about the growth of the company after that but, up to this point, you've shown a special ability in growing your company and understanding and dealing with government regulation, how to get them on your side.*

NQ: Up to this point, up to the Internet coming, government understood. We could talk to government and government would listen. The problems came much later. But up to that time, one of the first customers was the head of state, so he looked at it and said, but this is nothing. He was surfing the Web. Was very happy. He said nothing, but then he said the line is too slow, meaning 9.6—everybody's sharing 9.6. It's problematic. See, but even before 9.6 you know what we used to do? We had something called dial-up IP. So whenever we connect, my whole community can pass, so we used to do that when we're carrying mostly mail, see? So open the link every four hours for thirty minutes. That was then. Before '93, we were doing that.

HM: *So now one of the things that happens is consumers begin to know about the Net and they want to begin to access things like Yahoo and Hotmail and so on. That began to drive up your cost?*

NQ: Oh, actually the CNNs drove up more costs. It's the news people, the people who drew up more costs. I mean, the Yahoos and the Hotmails—it's just mail. You know, it's not that heavy, but those guys that

have the pictures and things in them that you can't cache, because they are changing all the time, are the problem. Because we were also very savvy engineers. We had our own Web caches. We all had our own packet shippers so there's no one person consuming all the traffic. (Laughs.) We were managing them so that, if you connect to the line, you'll get a fair use. If somebody is downloading big files, it does not slow everybody else down.

HM: *So you had to develop a pricing system to deal with that?*

NQ: Oh, no, we didn't, but we used instruments. Let's say I have thirty lines that we're connecting to. I will make sure that thirty lines get the same amount of bandwidth so that nobody begins to hog it, meaning we tried to use fair methods to do that. We used tools, equipment that will keep our packets filtered properly and shaped properly, so no one person hogs it because he happens to have a bigger modem or a bigger machine.

HM: *Now one of the things you've talked about though at that time, even though you had the satellite, and this is the challenge of cost structures both in the U.S. and here because you had vastly different cost structures, right? Wasn't it cheaper in the U.S.?*

NQ: Oh, always much cheaper in the U.S. and in fact that was one of the challenges we had. Imagine there is a content provider in Ghana who very

smartly does not host his content here. He hosts his content in the U.S. at very low rates, yet he's trying to get your customers to go through your tiny line to his website, you see?

HM: *So how did you deal with that?*

NQ: Well, that's when you say you'll do some filtering. You say that side cannot take more than this much bandwidth. Does the packet shaping, so if people are going there, they can't go there, because our job is to take them where they want to go but, if it's truly more than 50 percent of our traffic, we will slow it down to what we consider reasonable, so we have to network manage, and that was how we addressed that challenge. But eventually people realized that if it's outside, then it's no different from any other website as they grew. And we changed our pipe. Our pipe also got bigger, so it became less and less of a concern.

HM: *Now your business is growing. It's primarily at this point businesses, or are you beginning to attract retail customers?*

NQ: Oh, no, no. Retail was mixed in because, for a father who wants to talk to his only son going to school in the U.S., \$100 a month was not a problem. Somebody who is doing a project with the Carnegie Foundation as a consultant, who normally mailed his report physically, \$100 a month is not a problem. So there were individuals. And remember, most businesses

are SMEs [small and medium enterprises] in Ghana and they are usually mom and pop kind of businesses, small, few people, and they were all there. They were all there, so it was an interesting mix, from institutions to individuals to some schools. We even had a school net community that was kind of built by the World Bank.

HM: So now people are seeing you launch, your success, and other competition comes in. How do you deal with that?

NQ: The thing is, there was Africa Online and Internet Ghana. You know, really there was no competition because, from '93 to '96, we were the only ones who had any semblance of Internet running, and they all thought it was a regulatory privilege, where, as matter of fact, it was their lack of knowledge of how it works. If they knew how it worked, they could have also just gone and bought the same lines and bought the lease line, paid \$7,500 and £5,000 and they would have had it. They didn't know. So it was a capacity deficit. So for three years, we were training everybody. We were having seminars, workshops, every three months for three years, regularly, and all of these competitors attended all those workshops because I didn't care. I'm building my country.

Now the reason why '96 stands out in your mind is because that is when we got an independent regulator. That was when the sector got reformed and NCA, the National Communication Authority, was formed in

1996. That is when Ghana was visible but there was much more going on before then and that is what spurred the others to say oh, we can do it.

HM: *Because there wasn't a regulatory body before.*

NQ: Correct. Now that is where I'm actually complaining because the regulatory process should not have required licensing for ISPs. I don't see why you need a license to be an ISP, you see? An ISP is just like a business and operator. They now put in ISPs as one of the regulated operators, so now it affects everything, so now I was kind of under pressure by the regulator to come and regularize myself but, meanwhile, I existed before, and so there's a grandfather clause that covers my existence. But for a new regulator, it's as though you are a problem for him, so that's what changed the profile of the company from one that was moving everybody forward to one that had to respond to somebody and this started from the regulator. Now during '96 and 2000, it was not an issue, because it was the same government that granted those privileges that was still in power. So it was OK. We just competed, but you could tell the regulator is envious of you because you existed before him and he was constantly trying to take back some assets from you, and so on and so forth.

So the regulator was no more a friend, even though I was a regulator long before, see? In the early days, I was a member of the Frequency Board. What I'm saying is—you know, professor, a member of the

Frequency Board, that's a regulator, a private sector operator—these things help, you see? (Laughs.) That is how it started.

HM: *But then what happened?*

NQ: So we competed. There was no problem. There were jerks here and there, no problem. Then there were elections in December 2000 and then in 2001, January, a new government comes in which is not a social democratic party. It's more like the opposite, whatever you may call that. They did not understand many things. Of course, they also did not have the knowledge that the existing government had when we were building this thing. They didn't have it. Many of them saw the success of NCS as one of the achievements of the previous government, and it was indeed one of their achievements. You cannot deny it. Ghana got the Internet earlier than everybody. When we had the Internet, there was none in Nigeria. None in all these places. So it was indeed one of their achievements, but the first move of the new government was to start an issue over the domain names. They said we should give it to them.

I said, the one doing the .gh—the name space, Ghana.gov.gh, that .gh operation—I am authorized by Jon Postel to do that under RFC 1591 to do. They said I should give it to them.

HM: *Right. Let me stop you, because we missed a step. Early on, you had gone to ICANN and got the .gh?*

NQ: Yes, that was in '95. That was '95, '96. And this predates the formation of ICANN.

HM: *Was it easy? Hard?*

NQ: At that time ICANN was not formed. ICANN was formed in '98, but there was a gentleman called Jon Postel at USC in California who used to do this administration of the names and the numbers, one man. When he died, he was replaced by ICANN. This Jon Postel, he had a very unusual way of getting people to resolve problems. If there's a disagreement—they say I want to do it, you want to do it—he would lock us both in a room and leave us until we agree. That's what he started, that you have to talk it out. You guys have to solve it.

Fortunately for us, he was keen on expanding the frontiers of the Internet and he knew an Internet without names for a diverse community was wrong, so he was anxious to delegate these name spaces to different operators, so usually if you were the first person to really successfully bring in the Internet, he helped you. I got to him early. Because I'm part of the Internet society, we'd meet and so on and so forth. I might have talked to him in '93, '94.

HM: *So that's another asset that you had, right? Your worldwide contacts. You had great commercial contacts with DEC, which allowed you*

to first launch a sales and servicing business. That allowed you to get into the networking business because you could make bids and without having to go to the banks and get a guarantee; people knew that Digital was standing behind you.

When you decide to launch into the Internet, you see the opportunity, you have a relationship with various people in the telecom, so you're not given a great deal of difficulty.

NQ: Yes. That is true. It wasn't one touch, but eventually they understood.

HM: *Right. And you also happened to know, because of your worldwide circle, the person who's handing out...*

NQ: Correct. The name spaces. I knew the requirements—if you are running a good Internet, and they are aware that the Net is there and there's a document called RFC 1591. I studied it and I followed it. I approached him. He delegated it, made the Internet useful.

HM: *OK, it's all come together and so the new government comes in, what's the year?*

NQ: 2001, January. And then the first call I get from the chief of staff is, "I want the names," and I said, "Any name you want, you can get. Which

particular name?" He said, "No, I want all the names." I said, "You cannot do it like that. It's one by one. I have to know where it is going, pointing to, and who is the authority in case it's being used for the wrong purpose, I need to know who to contact." He said, "No, the whole thing." Then the fight started. Eventually I convinced him that, if you have a list, I will just load it for you and you can use it. He said, "It's that simple?" And I said, "It's that simple. It's not to prevent you from having names; it's just that every name must be qualified so that we know who is using it in case something happens and someone holds my neck, I can call the President and say, go bail me out or something." So he understood. I thought that was the end of the story.

This story continued throughout that whole eight years.

HM: *You're talking about the new regulations, new issues?*

NQ: Oh, you see, plenty. So after this name thing, I thought it was over, then in 2003 is when the real major problems began to occur. We were located in Ridge, which is very good neighborhood, quite downtown, and near the police headquarters and near the UN. It was a good location and all those lands were taken from some traditional family in Accra called Osu, and I happen to be from there. And the government has taken the land, and this new government was desirous of taking the lands to put in their pocket. They wanted to privatize all the lands in that region, so there was a rush for the lands at the Ridge.

One of the targets was the land that the infrastructure was based on, so several people showed up claiming they owned it and then we said, “Well, we rented it from some company, UTC Estates, so we also have an interest in being here. You can see we have infrastructure.” Everything was there. We talked and talked. Obviously they were adamant. They had it in their mind to destroy something.

HM: *So you think they were after it both for the land and also...*

NQ: Yes, and for the organization.

HM: *And for you? They wanted to get you.*

NQ: Yes, for me. Yes, they wanted to get even. They said I was friends with the powers-that-be of the past, and because we were a success story that they would point to: the Internet came to Ghana in '93. Who brought it? Nii Quaynor. He must have been friends with them. How come nobody could do it until '96? Oh, they were helping.

HM: *So it was a way of both getting land and getting you?*

NQ: Yes, really the thing was the land, but they had some intention to do something.

HM: *OK. So what happened?*

NQ: The reason I say they had an intention to do something because they did not do the right thing when it occurred. What we decide to do was say, let's wait. Let's figure out who really is the owner because we used to have our landlord and now three different groups have come claiming the land belongs to them. What do we do? Let's not pay this landlord anymore after the lease has expired. The documents we have show his lease has expired. So why don't we put the money in escrow so that we have evidence that the money is there and that we are just waiting to know who the owner is.

So we finally went to court, and the judge said, "Pay whoever gave you the land originally. Whether the lease is expired or not, the only thing you can do wisely is pay the one who you signed your first lease with." So then we said, "OK, let's talk about it. We are ready to pay, here is a check." So we had a meeting with the one who was claiming to be the head of that UTC Estates and a very important person, Chairman of the Council of State, mediated. So the understanding was I'll pay him, then he will give me an option to buy the property. I said, "Fine. How much?" He said, "\$500,000." I said, "It's too much," but that's what he says. OK. So we'll pay you. Then I said, "Oh, I can pay to the court," which is the right way, then the Chairman of the Council of State said, "No, no, just pay him. If you pay the court, he will get upset—the guy may get upset and you don't know what he would do. He decides not to sell it again and so on and so forth, so to show him good faith, just pay."

Within this, after the check cleared, the marshal bailiffs from the courts and police come and take possession of the property and seize all my assets. Yes. That's the story of NCS. November 26, 2003, all the assets of NCS were seized by a court order—repossession in 5A, that's what they call it when they take everything. They came and they took about fifteen cars, all the computer equipment, everything. They took everything away. OK. We went to court trying to argue that we were running a live system, a real time system, allow us to at least go and see the condition of our equipment and if it is safe, and it was denied.

HM: *Really? So the building was empty?*

NQ: We left it with the electronics running, those that they couldn't take, because we didn't show them the data center. They took what they could. We pleaded. We went to court again, saying that the generator is burning. We need to go. You know what their lawyer said? The lawyer said he's my customer and my system is still working, so I must be using that building. So they went and got a court order to turn off the power in that building.

HM: *So the Internet went down?*

NQ: It never went down, because I had rolled the traffic away from that place already. You see? Engineering versus politics. This is engineering fighting politics. So I went to court. They got the power to shut it down but

it was still working, so physically we had no place to work. We had an office at the trade fair site, a building there. We moved there to start salvaging and looking for our customers to tell them exactly what was happening and so on and so forth. We were given one month to get out.

HM: *At the new location?*

NQ: Yes, and we had been renting this new location for more than five years. The moment we started using it as our office—I'm starting to get a sense that it's a political maneuver. During this crisis, we went to ask the Minister of Communications to intervene. After all, if a bank is collapsing and it's going to hurt the economy, the central bank intervenes. If an insurance company is collapsing and it will hurt the economy, national insurance commission intervenes. So why don't you intervene? So he said, "Oh, yeah, it's a good idea, but, OK, why don't you go and see the NCA Director General, the chairman of the NCA, the regulator."

So we went, and they asked, who is the perpetrator of this discomfort? And we mentioned that it's somebody called Mr. Jonah—Sam Jonah. Then the chairman of the regulator said, "If it is Mr. Jonah, I don't want to have anything to do with this." So then it was evident that we had hit a wall. And so the ministry did not intervene and we just decided that the company will die but we don't want the Internet to die. So we began moving our traffic away from the building completely, so nothing attempts

to come to the building. Even the satellite—we move the traffic from our dish onto somebody else's dish.

HM: *Outside of the country or inside?*

NQ: Oh, inside the country. We went to what is now known as ATEL. It used to have a different name before. It was called WESTEL. So we went to WESTEL and for a fee they carried a transponder for us into GT and that was the thing.

HM: *Were any of your customers getting nervous while all this was going on?*

NQ: Oh, obviously, because eventually they all scattered. But to let you understand how technology and policy can conflict very violently, the same misunderstanding I told you about the domain names was repeated in December 2008.

HM: *What happened then?*

NQ: Days before the end of the government, the government was ending in 2008, they passed a law called ETA, Electronic Transactions Act, I think Act 772. They passed a law, the Electronic Transactions Act, that made it criminal for me to process names in .gh. Yes, this act was passed without

discussion with me, without me being given a chance to say why not, or have a chance to negotiate different alternatives. This law was passed, so obviously it was the intention of the government to take everything from NCS. Not only did they take the land, they shut it down, destroy the operations, and refuse to provide public infrastructure protection. I think by right of being a licensee, I should be protected by the one who licensed me. And them saying that if it's this person's, that's subjective: if it's that person, I will not get involved, is an indication that it was a plan. In December, they passed the law that made it criminal for me to process names in .gh. Fortunately these people were removed in January 2009.

HM: *And what happened?*

NQ: I became the chairman of the National IT Agency. I didn't fight for it, but somebody knew and NITA, the National IT Agency, is the one who executes the act, the Electronic Transactions Act, he's the implementer of the Electronic Transactions Act, so I'm now the chairman and they're saying it's for .gh activity. On consultation I decided that I should not fight a law, because it's too much to go through Parliament to repeal laws, but rather to foster the right conditions to be put in place. The first thing was that we need to rebuild the thing, because if you crush me the way you crush me, I'm not even sure what I have working is right, or is in good shape to give to you, so if you want me to give it to you, then you must cooperate with me to revamp it so that what I give to you is what we all

know is the correct thing. So that means I have to do some projects to prepare it for the transitioning.

The second thing is that, you see, government cannot be a player and a referee at the same time. So if you're government and you want to be the one who operates the .gh, you should not be the one to do policy. If that is the case, let's create a forum that makes policy for you to operate. These are things they obviously didn't know, they didn't understand, because, if they did, they would have rather let me continue doing it, under some contract with them, meaning that I do it, but I earn a certain percentage for everything I'm doing, which is a business approach. So instead of killing the thing and now restarting it, we could have just signed a contract that I'll work on this thing for the next ten years and we'll share revenue like this. They didn't think of that option. The option was we take it from him. And not only that, when this land thing was happening, he went on the radio and accused me. He says if you want equity, you should come with clean hands.

HM: *What does that mean?*

NQ: Well, his suggestion, my hands are dirty. All this episode, the whole thing was to malign, disgrace, take all my assets, you understand?

HM: *So when this was happening, during that six-year period, what was the status of the company? Did you have to lay off employees?*

NQ: You know, I told the employees myself that they should look for other things, because I can see the writing on the wall. So they left, gradually.

HM: *So the company closed?*

NQ: The company actually filed for liquidation about five years ago.

HM: *You had to close it?*

NQ: We had to close it. We knew the commerce had been damaged. If fifteen cars of yours have been taken and then everything the company owns had been taken, so I got to put more money in it.

HM: So how did you support yourself?

NQ: See, this is why you must maintain good relations. During the crisis, I took a job with the UN because I have friends there also.

HM: *So you closed?*

NQ: We didn't close. We kept it going, but we knew, we were going—and in fact at the time they seized the property, I had already taken a job with the UN.

HM: *So what was that job?*

NQ: Enterprise Africa. I was supposed to help the UN begin to do more entrepreneurial things in their programs, like help with business development, communities, and help them put together their chambers of commerce and different groups to actually begin to develop their own capacities and so on. It was that kind of a program. So going to a previously not very active business world, like Equatorial Guinea, and telling them how to have a chamber of commerce: got to have this, got to have that. And you have to be bringing people together to talk, because it's from the talk that they get motivated. So I had started doing that maybe six months before, so I was actually a UN official here.

HM: *So the company stuff got put on hold?*

NQ: We were managing it. One of the directors was managing it. Some left, some stayed. In fact, two of them, the one for finance and admin stayed and the one for engineering stayed for a very long time. Then when we liquidated about five years ago, the one for engineering, our director for engineering, moved on.

HM: *So when you liquidated— December 2008 is when they passed the Electronic Transmission Act?*

NQ: Correct. That, for me, was it.

HM: *So that's the end of the story. OK.*

NQ: I think you've got it. Yes, I think you've got it. For that one, it was very clear to me that the motive was not land. The motive was not exactly destroying the company. It was me.

HM: *So you work at the UN but then, in January 2009, the new government comes in. They ask you to help with the regulation?*

NQ: Correct. Of the IT side. Not the NCA, for Telco. You see, there are two regulators here. NCA is a normal regulator, the Telco, telecom regulator. The one who gives licenses for frequencies is NCA. This one is a new regulator that has been formed for IT. That's the one that I am. And that is the one that is responsible for this names thing.

HM: *So when did you go back into business? Because we're sitting here in the offices of a company called Ghana Dot Com.*

NQ: (Laughs.) Now you are seeing the picture. So I liquidate this one and I say, "Shit, man, I still got to do something," because there were many things in R&D when this company was hit. I tried to survive from 2003 to

2008, not straightforward. We know the economies don't pan out. Customers are looking for us to pay us money, they can't find us. Customers' equipment in our place have been seized, cars seized, so this was not tenable. Caught lawsuits—for instance, we had some loan from the IFC; they're after us, Intelsat segment space, because we had signed a thirty year agreement.

HM: *I was wondering about these leases.*

NQ: Oh, yes. They all came at play so I looked at these industries and I say, look guys, it's good to keep NCS alive for history but it's also good history to tell that it was killed by this event. So I liquidated the company, then I proceeded to form a totally new company, in fact, formed three of them. One is Ghana Dot Com. One is called NetSAT and then there is the third one.

HM: *And did any of your old team, did they come back together?*

NQ: Oh, no, what I'm saying is that we kept on going while they were dwindling. They were dwindling and I was left with two at the time I was forming Ghana Dot Com.

HM: *Right, so the three of you—they were still here?*

NQ: They were still here.

HM: *So Ghana Dot Com is launched.*

NQ: Correct. And we chose the name Ghana Dot Com deliberately, because when NCS was NCS, its email address was Ghana.com, so just to maintain some posterity or continuity, the way you look at it, we decided to call the company with the same email address.

HM: *And when did that launch?*

NQ: Five years ago.

HM: *In 2008?*

NQ: Around 2008, 2009. But that's a different company.

HM: *Tell me about life at Ghana Dot Com. Any challenges you've faced there?*

NQ: OK. Ghana Dot Com—first, what is it? You've seen the NCS was doing everything. NCS was everywhere, so I can understand why people want to kill it. It was too big. Look, we used to provide connectivity for the telcos. Internet for Ghana Telecom was built by NCS, so all of them were

passing through us one way or the other. This new company is focusing purely on content, because we don't have the might to compete with the telephone companies. They are wireless everywhere, meaning that Internet now is different.

HM: *So also the Internet changed.*

NQ: It's changed. I can't do the same business. That's it... was a totally different business environment. So when we looked at it, we said, what Africa does not have is content. Most of our content is news and news is no news for me. So maybe let's do something that can help build up the content in Africa. So this company's prime objective is to strengthen content development in Africa—not even content itself, because I didn't open a newspaper site. It's to help others do, so we are an accredited registrar, ICANN-accredited registrar, meaning we are allowed to register in .com, .org, .net, whatever. We are accredited, so we see a new company coming. It needs some muscle. It doesn't have a DEC to lean on, you understand? It doesn't have existing business to lean on, so what do you go for? Accreditation, you see.

We went for accreditation, so if somebody else has looked at us, they say, oh, these guys are capable of providing technical assistance. I can give them a domain, like Network Solutions or GoDaddy. I'm at the same level. So I'm competing with GoDaddy. I'm competing with Network Solutions. There are servers all over the place fighting with me. But my

point was that I want to enable—I want to be a tool maker for small businesses who want to develop websites for people or an individual home business that wants to build his own website and doesn't want to suffer too much, he can go to the site, buy a domain, buy hosting, automatically get e-commerce services.

HM: *So you're back in the service business?*

NQ: Yes, it's service, but it is content and service.

HM: *How's it going?*

NQ: This one is much slower, because the customers must have the capacity to develop websites or to write applications, right? Those are the customers that are going for this.

HM: *You won't do that for them?*

NQ: No, we will do some, but you see, it won't run if we are doing it all. Now this business is a low price, high volume business. That's why I say it's slow. We probably have about 1,000, maximum 2,000 customers, but you know a domain is about \$20. So we've got a thousand. Patience. I have big patience, because they are going to have domains eventually. They will not go to Facebook forever. Eventually they will realize that they need

more than Facebook and where will they turn to? They will turn to me. So I'm patient.

HM: *Are you living off your savings?*

NQ: Yes, I'm living off the savings, and then maybe picking up the salaries of some core actors. And then the rest they have to earn from other things.

HM: *Are you working? Are you back at the university?*

NQ: Oh, I never left the university. I'm still there. I'm a professor there but, you know, I stay in Accra and I go there to teach. It takes me two hours and I'm there and I teach for the whole day and I come back or spend the night, teach again, and then I come back, so I'm still there. For me personally it's not an issue. But I use my savings to support key talent and general support services and they are looking for business. Some businesses are coming. Eventually they will be on their own, but that's where I'm going.

HM: *Are you doing any e-commerce?*

NQ: Yes, I have a beautiful e-commerce solution unlike what people are doing. It's more like PayPal. I went that route. That one will develop this

year aggressively because I'm working on some interconnections with banks and things like that. If it works, then it will be good. But it is a very intricate solution.

You see, what we noticed was that, at least at the time when we were developing Ghana Dot Com, the business of this content, we realized that the bank cards' numbering was no good. Their numbers would never be recognized by [online] shopping carts. There's some format of the numbers that all credit cards satisfy that these numbers don't because they just pick the numbers in some rolling fashion. So that meant that, if you had a bank card, you could never use it in the traditional shopping cart. So I said, let me create an identifier that the shopping carts recognize, then I can hide your bank cards behind it.

HM: *How's that going?*

NQ: It's going very well. So if you go to one of our sites and you are shopping, the person will shop and pay with this card, with my card.

HM: *It's a PayPal.*

NQ: It's a PayPal. You use my card and there's no magnetic information. There's nothing. It's just the number and the ID, but your pin is in your head.

HM: *Where do you make money, from the merchant?*

NQ: Oh, both sides. (Laughs.) I have the option, but we take it from both sides. We take some from the merchant, you know. Right now we make it no registration for merchants, no registration for cardholders. But we charge 7 percent; maybe 2, 3 percent. We don't do the PayPal 30 percent. It's too high. You know, we do 3 percent and then in the beginning we are making the cardholders pay no charges, because it is a debit card, it is his money. So if it's his money, I should be paying him interest, so I shouldn't charge him. That way then I can get a large volume of cardholders and have the merchants pay.

The thing is, you have to load money into your card, so we have an agreement with one of the commercial banks, Ghana Commercial Bank, to be a receiver of money on the cards. So if you go to that person with your card, she will bring up some window, she will enter your card number and then your details will come, she will check it against it. If she is happy with it, then you pay your money, she enters it and the money is now here. Now you can go and shop with it. That's what the model is. So it's one that is trying to recognize the problems in our own environment and solve them, so the idea is to enable any card to be usable on the Internet by hiding it below some other cards which fulfill the interface requirements of shopping carts.

HM: *Right. So how are you feeling, having built one business and essentially having it taken away from you, how are you feeling about the future? How old are you?*

NQ: I'm sixty-five and I feel like it's just starting. For me it's less about business than about moving the people forward in a certain direction, so I'm looking to make an impact, but through business. I don't want to make an impact through civil society, because that means I have to go somewhere to get the money, but I want to make an impact through my social responsibility programs or, simply put, helping people do business and if I can, I am a tool maker.

I want to help people strengthen their business, provide Internet for people's business to improve, provide websites and domain names, e-commerce to improve people's business, so I see it as a long-term thing. It will take a while. It will take me around two, three years. Right now my focus is on increasing the repositories people can register into. Right now I have all the generics, meaning the .com, .org, .net, .tel. I have all of them, but I also have .gh. But I want to have .ng, Nigeria, so Nigerians in Ghana would come to me to register names in their home and pay me cedis [Ghanaian currency] for it.

HM: *Can they do that?*

NQ: Oh, once I get up the connection, yes. They come to me and buy .com, so they should be able come to me and buy .ng but I have to add them into my list of connections, so I have to do something with them and we are doing it now. The vision now is to increase the number of repositories to African ccTLDs [Country Code Top Level Domains].

HM: *So you're going to grow the business; this could be a Pan-African business.*

NQ: Oh, yes. This is already a global business because people come to register names from Saudi Arabia.

HM: *With you?*

NQ: Yes, because I have a good price.

HM: *And you give them a .com?*

NQ: Whatever they choose. They are taking the generics. I'm just like a GoDaddy, I keep saying. I'm just like Network Solutions. The same way I go from Ghana to Network Solutions, which is where I used to keep my domains, in the U.S. Somebody from the U.S. can come to me and do the same; if they look at my prices and say, this is a good provider, so that's what's going on.

HM: *I do want to talk about your view of Ghana and the Internet, and that is that obviously there's high cell phone penetration in Ghana, but not so much smart phones. In fact, if you look at the statistics for Ghana, the worldwide average for Internet penetration is over 30 percent. In Africa, it's about 11 percent and in Ghana it's only about 5 percent. Tell me about the future of how we're going to get those numbers up.*

NQ: You know, I think these numbers are being contested. Whether it's true or not, I don't know, but the last set of numbers I saw at NCA were higher than the five but not significantly. Ten is what they were talking about.

HM: *Not thirty?*

NQ: Not thirty but, you know, it's supposedly getting there. Now Ghana also boasts of having one day somebody come and measure the speed of broadband and ranking Ghana very high. That may just be because we have an idle network, but that's beside the point. So there are some challenges there.

Now, I am of the belief that it is indeed much higher than is being reported, mainly because of mobile Internet. The mobile companies cover every part of Ghana that people are living in and they are all carrying Internet traffic. Not every location has 3G but I'll bet you we have more 3G

in Ghana than even in the U.S., because here we went after 3G. India and all others are just starting to do 3G but we went early, because we wanted to have the data. We didn't see how we would cover the whole geography without wireless. It was impossible. So I have a feeling that as a result of that, our number may be approaching the thirty, maybe, I don't know. I think it may be approaching thirty.

The second comment one can make is that it is believed by NCA that we have about 40 percent smart phone penetration. Meaning among whatever we have as Internet users data. Those who are using dongles [small pieces of hardware that attach to electronic devices], things like that. They are telling me that that's the quantity. It's 30 percent of all of our Internet users, which is good news. It's good news in the sense that even before our Internet penetration reaches 50 percent, nearly half of the users are using smart phones. That gives me a lot of hope. So you may be surprised to learn that I myself, I write programs for the iPhone. I already have four programs at the App Store.

HM: *What do they do, just for the record?*

NQ: I have some for games. I have others doing other things but I have been fascinated for a very long time, even before I finished school, by a certain African board that we'll call a game—a board with six holes. Because it turns out it is as powerful as the abacus in doing calculations. So it's not counting. I can actually do additions and subtractions on that board

and if you give me that East African type of board, which is four rows, I can do multiplications and divisions, and I teach this in my computer science courses. I was for a long time looking for some justification for why an African is doing this. They say, “Why? To me, this is foreign,” and I say, “No, it’s not foreign. We’ve always had calculating instruments.” As an African, I say no, it’s not foreign. We’ve always had devices that did calculations for us before the calculator came, so it’s natural that when this also comes, we will do that one, too. Don’t tell me it’s foreign, because it was part of our history.

Then they say, “Oh, but this is only a game.” I say, “That’s what you thought. That’s what the colonial masters told you, that it was only a game. I am telling you that it is a calculator.” So, for that reason, I have been fascinated by building the games, just for record purposes. So I’m not doing it to sell it. That’s why I put it there for free. I want to capture the algorithms, the rules for the games which people are forgetting, so for each variant I publish, once I implement that variant, I put it at the App Store, so I’m putting it at the App Store like it’s my catalog, but that’s the reason why I have apps there.

But I see the apps as another major area that Ghana Dot Com will look at. I’m training people who do it, because I teach it at AfNOG, you know. Some of my civil society work is to help Africa produce better engineers or network engineers, so there’s an organization I founded called AfNOG, which is African Network Operators’ Group, and they have grown from a two-track workshop to seven-track workshop with French, bilingual.

We are teaching mostly the technical things for network operators, the server side things, the routing type things, then the set security. We do things with the research community, the RENS, research education community and so on and so forth.

Even AfriNIC, the numbers registry in Africa, I founded it—so all of those things, I founded all of them. But notice I did that as my not-for-profit interest. That's why I mention hats. The ability of a person who can wear different hats simultaneously or at different times is a very important catalyst for development. I am saying if I didn't have that kind of relationship with government regulators, academics, who can be most vocal in challenging every new thing, the Internet would not have come.

So the same way, if I didn't help Africa to have its own numbers registry, perhaps the Internet in Africa would not have grown. Even while I'm doing that, my civil society interest is building a supportive business environment. You see, before, to get a number when I started, an IP number, I had to go to Europe to get it. Anything above the equator, it's Europe. Anything below the equator, it's North America. If you are in the Indian Ocean, you go to Asia Pacific. That was the situation. But I changed it so Africa became one of these five who give out the numbers. Now who uses the numbers? Is it ISPs? So I was doing these things to open the door for African business, so I do a lot of those things. Even the ccTLDs. That's the .gh and .tg, we call them ccTLDs. These ccTLDs, I'm the one who formed them together into a Pan-African organization.

HM: *Do you still sit on that board?*

NQ: Of which one?

HM: *The regulator.*

NQ: Oh, actually they have not changed this. Yes, I'm still there. Perhaps I'll still be there. My position is, you need me, I don't need you. I can be arrogant but my point here is that I have something that can help the government and I'm willing to do that and it's not the only one that I work on. I worked on GhiPPS, the bank's switching company. I'm on the board. I'm on the board of the National Identification Authority. I'm all over.

HM: *Well, it's fantastic, and fantastic to get your story into the archives back at Harvard University. It's an extraordinary story of someone who built a business, lost a business, started a new business, but at the same time has wrestled in a very deep way with how government can affect business, challenge business. So in your lifetime—and you've obviously got a lot left—you've really done an amazing amount of things. I'm so glad that you agreed to share your story with us.*

NQ: I'm sure there's more but over time, we will discover more.

HM: *Well, thank you so much.*

NQ: *My pleasure.*

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