The Father of Singularity: A Case Study in Creativity and Innovation

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Honored guests, ladies and gentlemen:

I am deeply grateful to you for giving me this opportunity to address you today.

I have been asked to share with you some thoughts on the topics of creativity and innovation.

I know that here, today, at this excellent educational institution, East China Normal University, you have been studying these topics.

We all share an appreciation of the importance of these topics, because very many people agree that human creative and innovative endeavors are fundamental to human progress everywhere.

So, we would like to study creativity and innovation, to understand these human processes more deeply, and we would like to improve how each person actually engages in these processes, so we can see further human progress in many areas.

There might seem to be an immediate challenge to our ambitions here, which is that even what we mean by the terms "creativity" and "innovation" is not simple to say.

But we should not worry too much about this. The great American physicist Richard Feynman --- many of you will be familiar with his widely used undergraduate textbooks on physics --- wrote:

"[W]hat do we mean by *time* and *space*? It turns out that these [are] deep philosophical questions …. However, for our present purposes, for the accuracy that we need at first, we need not be very careful about defining things precisely. Perhaps you say, 'That's a terrible thing --- I learned that in science we have to define *everything* precisely.' Actually, we cannot define *anything* precisely!"

So, following this advice from a great scientist, let us be pragmatic and work with some approximate definitions, along the following lines:

-- “creativity” is using our internal mental worlds and external observed worlds to generate a new idea or object

-- “innovation” is taking creative ideas or objects and using them to establish new activities or organizations

Let me note as an aside that, seen this way, entrepreneurship involves both creativity and innovation --- the emergence of a new idea or object, and its realization in a new activity or organization.

In short, when I talk about creativity and innovation, I am definitely also talking about the ingredients of entrepreneurship!

Back to our definitions. There is a great deal of research that has been done into the nature of creativity and innovation --- by psychologists, cognitive scientists, historians, business-school professors, and by scholars from other disciplines, too. There are some tentative frameworks and theories.

But I think it is also very important to go directly to the data. There is a saying in statistics: “Let the data speak for themselves.” In the case of creativity and innovation, the data are fundamentally the people who have exhibited extraordinary creative and innovative achievement.

I will come to a specific data point, a specific person of extraordinary ability in these two senses, in a moment.

Before that, however, I do want to underline this approach, this method of study. I was a professor at Harvard Business School for many years, before moving to New York University in New York.

The history of Harvard Business School is very interesting and quite surprising. I think there is a very important lesson here for all of us in 2017, as we turn our minds to, and invest resources in, understanding and advancing in the areas of creativity and innovation.

Harvard Business School was founded in 1908, to train people to manage the then newly-formed large-scale American business enterprises of the day. The founders faced a choice.

One way to build the new school was to build, essentially, a department of applied economics --- to teach the prevailing economic theories of the day to business students, perhaps in a somewhat less formal or mathematical style, and trust that these theories could usefully be put to work.

Another way was to say that what was first needed was a lot more data about the actual configurations of the big businesses of the day, about the approaches and behaviors of the people in these big organizations, and then to try to find some patterns and to formulate some frameworks to help people distinguish between better and worse ways of running these businesses.

We know which road the founders of Harvard Business School took. They took the second road. They started writing detailed case studies of businesses, detailed all the way down to recording what managers in the businesses said and wrote. This was how the famous Harvard Business School case study was born.

As to what to teach business students, this has evolved. Over time, some approximate general principles and frameworks emerged from these case studies. And these principles and frameworks form part of the modern business curriculum. But Harvard Business School never took its eye off the case study. The school continues to write cases, and it continues to teach the cases --- still letting the data speak for themselves, if you like.

So, this was what I learned as a professor at Harvard Business School. Today, in 2017, the topic is not so much what was called "business administration" in the early days of business education --- the administration of large business enterprises. Today, the topics are creativity and innovation.

But I believe the same method can be fruitfully adopted. This is the method we are adopting in the Program on Creativity + Innovation which we are building here in Shanghai. We have begun assembling and teaching case studies around creativity and innovation. We have only barely begun. We have a lot we must do. We need more data. We want to discern some general principles and frameworks. But, we believe that the raw data themselves --- in the form of case studies --- can inform us and our students right away.

Together, many universities in China can work to build a big collective database of case studies of creativity and innovation. I would be delighted to see this happen.

I said I would share with you a specific data point --- a mini-case study --- of creativity and innovation. Time does not allow me to go into much detail, but let me share with you some summary points of just one case in point.

It may strike you as a curious choice, since this case study does not concern a businessperson, and he is from the twentieth-century, not the twenty-first century. But I thought of him when I saw the title of your event here today, and I noticed that it includes the term "the Age of Singularity." Well, it turns out that the person who first used the word "singularity" in this way, who first saw that modern technology

may drive us to a fundamental change, not just in degree but in fundamental kind, in how all of us on this planet live, was a world-famous mathematician called John von Neumann. He said, a long time ago back in the 1950s:

"The accelerating progress of technology and changes in the mode of human life, give the appearance of approaching some essential singularity in the history of the race."

This is first use of the term "singularity" --- it comes from this mathematician called John von Neumann. Those of you in the audience in mathematics, physics, and computer science will know his name and his work. He did fundamental work in all these fields.

Actually, von Neumann was an active business consultant as well as scientist. If alive today, he would definitely be an entrepreneur as well as scientist.

But, even if by creativity and innovation, we have, in mind, principally, the worlds of business and economic growth, we should not narrow our minds and fail to learn from examples of creativity and innovation in all fields. For example, a number of business scholars have studied a particular chamber orchestra that is distinguished by the fact that it does not have a conductor. Might there be some lessons here for shared leadership in other settings?

It is one of the assumptions of the Program on Creativity + Innovation which we are building here in Shanghai that we do not draw case studies only from business, or only from the arts, or only from the sciences. We want variety in our data.

I happen to know about this mathematician, John von Neumann, because he was one of the founders of a field called game theory, my home discipline. However, I am not here today to talk about this area of my research. I am here to talk about creativity and innovation.

Now, to be clear, I have not chosen just any moderately creative and innovative individual as my mini-case study here. This man was a giant even among the great minds of his time, with an office at Princeton near Einstein's.

What has reading about the life of such a giant of creativity and innovation taught me?

Lesson #1: Know yourself. John von Neumann was not always the initiator of the fields in which he worked. For example, in computer science, the famous British mathematician Alan Turing came first. But von Neumann was brilliantly astute at picking up an emerging idea --- in this case the emergence of the modern general-purpose computer --- and then giving it a very clean and powerful mathematical

form. In business-speak, he spotted emerging trends and came up with the best and most widely used concrete instantiations of these trends. He had a gift at spotting trends. He knew himself and his area of strength and he made very good use of it.

Some people made have the first idea, other people may have the second idea, other people may realize what is wrong with an existing idea. There are many ways to operate. Know yourself. No need for false ego. Find out your particular strength and capitalize on it.

Lesson #2: Know the world. John von Neumann was famously cosmopolitan both literally and figuratively. He was born in Hungary, studied in Germany, moved to the United States, where he traveled extensively. That is the literal part, and he met many of his key co-authors --- in the business world, we would call them business partners --- along the way. He did not stay in one place. This was one form of his being cosmopolitan. The other part was that he kept crossing the boundaries and borders of different academic disciplines. This is an important point. Some of von Neumann's academic colleagues criticized him for getting distracted by new things. Some of his mathematician colleagues were horrified when, in the 1940s, he started tinkering around in the basement of the building at Princeton, constructing primitive computers with vacuum tubes. He didn't care. He was having fun and he was being creative and innovative.

Lesson #3: Know fun. Von Neumann was a rather happy person. He worked away on his mathematical papers, but he was also known for holding very lively parties. He drove fast cars (not very well and he often crashed them, if you read the biographies of him). It is clear, I think, that his sense of fun was part of his creativity. He was serious --- he produced very deep mathematical work --- but he was not too serious.

Lesson #4: Know the future. This sounds rather difficult --- in fact, impossible. Of course, we cannot know the future. But this creator --- who happened to be a mathematician --- kept placing bets, kept guessing the future. He didn't get it all right. He saw the future of computers. In some of his last work, he attempted to apply the conceptual architecture of the then-new all-purpose computer, marry it with the neuroscience of his day, and come up with some ideas on the working of the human brain. In this work, he got some things right and some things wrong. The common theme is that he knew that the future was what was mattered. He was not interested in proving beautiful theorems within existing areas of mathematics. He preferred a unfinished new crystal to a polished existing crystal.

So, a mini-case study right here. Four tentative lessons --- just from one case study, just tentative. In the areas of creativity and innovation, we may care to think hard about how to:

Know yourself
Know the world
Know fun
Know (or, at least, try guessing) the future

Let me close by restating my main proposition. I was asked here to speak briefly about creativity and innovation. It is an honor for me to have been given this opportunity. I defined the terms “creativity” and “innovation” roughly --- and roughly is good enough for us to get started. I said that I believe we should put data ahead of theories, at least for now. And data in this area means human stories of creativity and innovation --- carefully researched and told, but fundamentally human stories. Then we can begin to develop some general principles and frameworks, and we can all help one another advance in these fundamental areas of human endeavor and progress.

This is the philosophy --- the strategy, in fact --- which I am advancing in our program at NYU Shanghai.

I am very grateful to all of you for listening to my ideas this afternoon. I am very fortunate to have been able to join you in this examination into how all of us present, professors and students, can create and innovate our way to a better future for ourselves and for those who come after us.

Thank you.