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New Contours of Management:
Artificial Intelligence, Interconnected
World and Industry 4.0

by

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New Contours of Management: Artificial Intelligence, Interconnected World and Industry 4.0*

I always start by discussing my name. My name is Jagdish Sheth. We know how to pronounce it, but when I went to the United States in 1961, and became faculty in 1963 at Columbia University, all my colleagues were non-Indians, and they did not know how to pronounce our names in those days. So, one of my colleagues told me, we don't know how to pronounce Yagdish, Jagdish, etc., so we will call you, Jag, like in Jaguar. Ever since then, I have been dreaming of owning a Jaguar with a license plate, 'Jag's Jag'. And the dream became a reality 20 years ago when I turned 60; I am 80 now. Do I look 80? No. That is because I am in marketing. Diplomacy will age you. In marketing, the first thing we learn is that it is all about packaging. I have two children, they are married, and I used to talk about Jag as in Jaguar, and they surprised me on my birthday. I don't count my birthdays. I come from the old generation. I went out in the morning to get my newspaper, turned around and saw this beautiful Jaguar, XJ model, top of the line, even the colour I like, parked in the driveway with a handwritten license plate, 'Jag's Jag, happy 60th birthday'. It turned out to be a rental car. True story! I am still looking for my Jaguar.

Here is the irony that Ambassador Singh was mentioning. The British official car was the Jaguar. On every diplomatic assignment, or at any diplomatic outpost, they had to use a Jaguar, which is interesting. It is now owned by an enterprise from an ex-colony called Tata Motors. Isn't that interesting? The world has changed that much. And management therefore has to adapt to that world.

*Lecture delivered on 2 July 2018 at the India International Centre by Jagdish Sheth.

Many years ago, I wrote a book about why good companies fail. It was a great journey for me. It came from the most insightful question I have ever been asked by any chairman of a large company, at a one-on-one coaching conversation. He said, Jag, do you know why good companies fail? I said, I don't know. I never thought about it. I thought companies never fail. Humans have a finite life, companies are eternal. That is what I was taught and I taught others. Then I began to look at the data, and found that the average life expectancy of large corporations listed on the New York Stock Exchange is now down to 4.5 years. The London Stock Exchange, the FTSE index, as it is called, which is an index of large corporations, is about the same. There are many more mega mergers now. If you look at the Fortune 500 companies, those that were eminent are just not there, the latest casualty being General Electric (GE). Ten years ago, nobody would have thought that GE will almost be out of business. That is true of Sears Roebuck in retailing. Interestingly, that was true of Kodak, another brand name. So I began to analyse this and learned a lot in the process. I found that most companies are unable to sustain themselves or survive if they are unable or unwilling to adapt to the changing environment.

One of the key drivers of change is technology, which is the focus of today's talk. If the companies are not able to transition from analogue to digital technology, you see disruptions, such as Amazon in retailing. Or, you see disruptions from rising companies like Uber that are transforming the ride-sharing industry completely from outside in. So, in my presentation, I will articulate how technology has consequences on society, and definitely consequences on management.

Every technology has changed management practices and principles. The industrial age (which I will call Industry 1.0) and the industrial revolution primarily changed production. That was the key intent. There was a change from custom-

made products to mass produced products. Assembly-line principles of Henry Ford made products in the process more affordable, such as the Model T car. He designed the car for US\$400, so his own employees could afford the car; the automobile was otherwise in the luxury car category. Similarly, Timex revolutionised watchmaking, primarily through automation. So did Kodak in the camera industry.

Scientific management principles were popularised by Frederick Taylor, who always talked about time and motion studies. We studied and taught these principles. Recently, we have espoused Total Quality Management (TQM), and of course 6 Sigma became very much the norm, in the production department. Lean operations is the latest one that Toyota has codified four major processes—just in time, TQM, customer orientation, and cycle time—in what is referred to as the Toyota way of making products. This is why Toyota became the number one carmaker, surpassing General Motors and Ford. That was unthinkable only 20-25 years ago. But companies like Toyota led the way, and it is primarily due to innovation in process technology. And of course, in this particular case, the emphasis was on fixed capital. Whoever had the capital, the capacity to invest, made the difference. We shifted from labour to capital primarily. There were railroad barons who made money. There were steel magnates who made money. Assembly-line automobile companies like Ford made money; it was basically the automation of production or automation of the factory.

One of the key drivers of change is technology, which is the focus of today's talk. If the companies are not able to transition from analogue to digital technology, you see disruptions, such as Amazon in retailing. Or, you see disruptions from rising companies like Uber that are transforming the ride-sharing industry completely from outside in. So, in my presentation, I will articulate how technology has consequences on society, and definitely consequences on management.

Industry 2.0 is very different. It now migrates towards what I call the infrastructure age; focus was on building railroads, highways and trucks, which became the main vehicles to distribute products. From production, the emphasis now shifted to distribution, where there were inefficiencies or lack of capacity, and therefore expansion of capacity was key.

For the first time, we heard the concept of ‘make it here and market it there’. Incidentally, I have done research on sustainability work, and I have a different perspective on climate change. The world was just fine before the industrial revolution, and we made two major mistakes: the first one was to dissociate or divorce production from consumption at the same location, and about the same time. We produced more here; therefore, we had to seek markets elsewhere. That divorce between production and consumption has created more carbon footprints than anything else. If we can somehow bring production and consumption back together in a more contemporary modern way, we might be able to reverse, not just reduce, the global warming phenomenon. It is within our capacity. This is a controversial theory, because not all believe that we can reduce or reverse climate change. However, my view is that just as with heart disease, you can reverse it.

The second thing is much more interesting. We began to realise that nature is biological; be it corals on the one hand, or coal mines on the other, they are all biological species. And if you abuse the biological species, it reacts by passive resistance. So this slowdown of prosperity (either through public policy or private sector initiatives) will be neither technology nor capital, which we thought were the barriers to growth and prosperity for emerging economies, but rather, it will be the environment. The environment will make you slow down because when you abuse anything that is a living, breathing species, it always reacts by passive resistance. We have seen this in animals. We have seen it in human beings. So,

it is very important to understand that nature is not an inorganic element, as we believed in the first industrial revolution, but is a living, breathing entity.

The third stage is primarily what I call the information age, on which I have done significant research—especially for the telephone industry, the government, and made the policy recommendations—in the United States and other countries. The information age, as it is often called (or ICT: Information and Communication Technology, as I like to call it), changed the way we do commerce. In other words, following production and physical distribution, now it is trade and commerce. Telephones, television, computers, the Internet and mobile phones revolutionised things which we are still experiencing. For the first time we saw the rise of credit cards, which is a very important element in commerce. And now, e-commerce. So, companies such as Flipkart, Amazon, Snapdeal, Alibaba, among others, are all part of today's ICT revolution.

Data now became mobile; data was no longer in one place, but one could distribute and use data all over. We finally have broadband and the Internet in mobile phones, which is bringing about an enormous change in society, and online buying is now almost commonplace. Most of what we need from airlines, banks, etc., is becoming online, and they will mandate online and relegate mail or in-person meetings. Online will be the only option, and if you do not want to do anything online, you have to pay an extra price.

Now, we come to Industry 4.0, which is the knowledge age, as I call it. People will coin a better term. This is where artificial intelligence comes in. It is a very powerful technology that is trying to mimic the mind in many ways, both the cognitive side and the memory side. Data mining is another key area as a part of this. In business intelligence, which is at the early crude stages with artificial

intelligence, I can get more insights than other possibilities. This is very useful in cyber security, anti-terrorism and other government-military uses. However, in the management field, the biggest impact is going to be by social media. The largest nation in the world is no longer India or China—it is a nation called the Facebook nation. There are two billion people connected together, across legal jurisdictional boundaries. How does the nation of Facebook behave? It has several management implications. For example, what is the governance mechanism? Or who governs it? Artificial intelligence is just one element.

Knowledge mobility (as opposed to data mobility, people mobility, or product mobility) will become key in Industry 4.0, and how will that impact the management? I will come to the implications in a moment. Like artificial intelligence, I am very interested in the impact of blockchain on the future of management governance—not crypto currencies, but the underlying technology. Blockchain will make major transformations, with probably as big an impact as the Internet has had. The Internet has changed our lives. Blockchain will do exactly the same, maybe more powerfully, and artificial intelligence and blockchain will go together, a convergence will take place between the two.

Let's talk about the side effects of these. I have been working on a book for about a decade, on what I call the seven side effects or the dark side of the Internet. I had never thought about some of the side effects, apart from digital addiction which everybody knows about and has been researched. The first one is when virtual becomes real. When virtual becomes real, what happens to society and, therefore, to management? Are those management principles (customer-centric, employee-centric, supplier-centric, investor-centric) the same in the virtual world? Is virtual reality much more appealing to humans than the real world? I know, for example, people who are residents in virtual communities such as

Second Life and Farmville; they are more obsessed about living in that virtual world than the real world here. So, the impact is not as much for the industry itself, but for the users of this technology. So, we have to understand user mentality about how artificial intelligence and virtual communities are becoming more real than real. Just like video games. Have you seen the launch of new video games? The first-day release alone will bring in a revenue of billions of dollars. Remember Pokémon, and remember that people actually killed themselves following the clues. That is where the impact will be and not on the management as much.

I believe that the technology we already have will be augmented with artificial intelligence and result in what I call the rise of the roommate nation. We, in the educated class, behave like roommates in the family today. Nobody has time to eat together any more. From a nation of diners, people have become a nation of grazers. People like to eat standing up; they have no time to eat and enjoy each other's company. I see that in my own family. My grandchildren, for example, after eating the meal start text messaging, or watching YouTube, or conversing. I have photographs of the family sitting next to each other, text messaging. And I thought that was the younger generation. But my children took a photo in which my wife and I are doing the same thing! WhatsApp is very addictive. I didn't know about

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WhatsApp two years ago. Somebody discovered that international calls are free on this platform, and now I find myself curious about videos people send me in the affinity groups. It keeps you more engaged and occupied than any television programme. Isn't that interesting? That is a change.

So, with the rise of the roommate nation, what happens to the family structure which is a key unit of analysis and understanding in a society? Just as one has enterprise as a unit of analysis or government as a unit of analysis. The next generation of young people have forgotten the art of cooking, cleaning and childcare. The biggest change is in America, and I am sure it is going to happen in India. It is a matter of time before the global universal phenomenon of outsourcing of homemaking (not IT services to the Indian IT companies) comes to India. In America, one and a half meals are eaten away from the home each day. Furthermore, of the one and a half meals that we eat at home today, more than 50 percent are cooked by somebody else; they are just delivered. Ready to eat, not ready to serve or ready to prepare. Similarly, the art of cleaning has also been forgotten. There is a very interesting law (as good as Newton's law or Einstein's equation) which says that anything you give up as a main activity always comes back as a hobby. Hunting, fishing, gardening, baking bread...now, it's cooking. Have you seen the popularity of the food channel on cable TV? They make ordinary cooks into celebrity chefs, almost like movie stars. There used to be a dividing line in America, where the man would be in the basement or the garage working with tools, and the wife would be in the kitchen. Today, men are as much in the kitchen as women. People don't want to cook daily, but they want to be weekend gourmards. They want to show off their kitchen just as they do their automobiles. This is a significant change. This is a part of the roommate family as a phenomenon; and when the whole nation behaves like that, what happens to society?

The third side effect is what I call the Uberisation of markets. It is a real phenomenon which fundamentally says that people will stop owning things and will begin renting them. Capitalism came about on the basis of private ownership. What if you don't own? I don't want to own a home, but I would like to use Airbnb. I don't want to own an automobile, but I would like to actually rent an automobile all the time. So Uberisation is just the tip of the iceberg. We will see more and more Uberisation of many activities in society that will have major consequences on people's balance sheet.

Digital addiction. South Korea is digitally addicted. Japan is waking up to the same thing. China is already aware and now has detoxification centres next to cyber cafés. They are finding that this is a very addictive technology, changing the whole next generation of people who, because they don't have computers at home as much, go to a cybercafé.

The next area is one where I am doing quite a lot of work. In the digital age, I find that it is virtually impossible to own intellectual property rights. I can sit in a small corner, and using Apple software or Sony software make a movie on my own, so long as I have a story to tell. I can pick up all the images and videos, etc., from public hosting platforms and produce my own movie; and I own the movie. I am the chef who makes a meal, so the salt brand named Morton, which is what we have in the United States, loses its identity and its intellectual property. The same is true with the Domino brand of sugar. There is no way the legal system based on patents, which is defined by the industrial age, can be sustained any more. Artificial intelligence will make it worse as you go along. The whole legal profession has to understand how to create new sets of governance mechanisms, so that whoever creates something new has its intellectual property rights, and at least a share in the revenue. It has to be managed differently. This is a very big change where the

legal profession is obsolete in the digital age. It was designed for the industrial age primarily. And these jurisdiction issues are not limited to intellectual property rights. If I am a Facebook nation, I don't recognise any geographical boundary of any nation. I am a citizen of Facebook. I have no concerns about America. Who cares? What happens when a citizen loses identity with his or her own nation, which we keep up with the flag, with the national anthem, and an airline, for example; we lose that national identity and belong to Facebook, but Facebook says you belong to me, not to the nation of your birth.

Stranded assets is the other area. I have done some research in the utility industries, both the power industry and the telecom industry. There is so much copper wire in the ground that is mostly obsolete. Most of the copper wire on the balance sheet of corporations is still at book value and has no value whatsoever or much less value. Most balance sheets of utility companies are overinflated in the process with respect to electronic or digital infrastructure. There is often not even a salvage value. So, companies such as AT&T and Verizon are switching customers away from copper wire (landline) technology, hoping that they will survive in the process. Massive stranded assets in factories are all going to become less valuable on the balance sheet. I find balance sheets are generally inflated. So, when I analyse corporations for investment or advice, I look at their balance sheet and nature of assets. If they are industrial-age heavy assets (and by the way this is a key issue for General Electric right now), it is likely that their book value is inflated.

The last side effect is public acrimony. Have you witnessed the acrimony in the public domain today? Starting with national leaders or international leaders, tweeting messages, communicating, inflaming audiences in one way or the other. My interest here is in the management. I find it fascinating that most senior

leaders in a corporation who grew up with the old industrial age mentality thought that their personal life can be separated from their professional life—absolutely not possible any more, especially after the #metoo movement.

Memory is cheaper than paper today. The biggest revolution has not been the microprocessor, but the memory chips. I can store today, on my flash drive, a whole encyclopaedia. I can even store the whole Library of Congress, where all the books are deposited. It is a very powerful device that allows me to keep the memory forever without any cost. So any indiscretion on my part, at any time, is present there. The only way out for leadership and management is, therefore, prevention, not correction. Apologies won't be enough anymore. Accountability will be demanded or enforced.

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Unfortunately, a large number of CEO's think that their personal life is like living in a gated community. How I behave in my personal life is none of your business, but today the two are totally blurred. In fact, I find it fascinating that if I want to know what I did yesterday, I do a Google search on me! There is so much surveillance in society. Every retail store now has cameras. Every neighbourhood has cameras. So, these are the new contours of governance. Management is all about governance. In my view, governance will shift with artificial intelligence, universal connectivity, and global interconnected society. It will shift from the hierarchical governance that we know today. So, you have the Chairman of

the Board and the Managing Director, the Vice Chairman and the CEOs, and down the road the hierarchical system now becomes obsolete. Governance will be actually distributed governance, which is why blockchain is very important because it allows distributed governance. Checks and balances are already built in; no government can do checks and balances better than blockchain. Similarly, governance will shift from external governance (for example, public policy as a governance mechanism), and will instead become more self-correcting, self-improving, and self-analysing.

So, let me go through the issues and the consequences as we embrace the knowledge age. The first major consequence is that human capital will come at a premium. I have the contrarian view to all of these doomsday theories about artificial intelligence creating labour surplus. No technology has ever done it. It shifts human talent to higher wage occupations.

Today the factory worker commands on average about US\$25, a fully loaded cost, including fringe benefits. On the other hand, the knowledge worker in the United States today commands at least US\$60 per hour. So, humans have become more premium-commanding than the agricultural age, which was the worst age possible for humans. You were basically bonded labour or slaves and had no life. There was no weekend off, there was no Sunday. Compare that to what we do today. So humans will move up to the next evolution, commanding higher and higher wages, which is contrary to expectations. And a nation that doesn't shift, or a company that doesn't shift, is likely to be caught, trapped in the transition.

I do believe strongly there would be a rise in contract work. The employer-employee relationship was established for the industrial age. The bonded labour was for the agricultural age. In tomorrow's age, essentially the knowledge age,

workers will opt to freelance. They don't want to work for you. In India, this is true of family-owned traders and merchants. Their counterparts started their jobs with a company and retired from that company. They were very loyal to the company after retirement; whether you are a Tata person or a Birla person. Today, young people don't even want to stay in one place for more than three to four years. Contract work appeals to them. That is the Uberisation of work on the supply side.

So, the traditional relationship of employer–employee will become less and less prevalent and contract work will become more and more prevalent.

The new reality at General Motors is surprising because they never changed from the old model of employment. They had a model where their nine new workers funded one retiree. There was no end to getting premiums to support a retiree. Today, for nine retirees there is only one new person contributing to the pension plan. The most bankrupt companies in America are companies with huge legal obligations for pension plans and health care benefits, which is why they have to opt for Chapter 11 protection just to survive. And the most bankrupt nation today may be the United States because of its social security obligations and ageing population. They are just in a denial stage.

By 2030, the number of people contributing to social security will decline, and someone will have to figure out how to tax people when they work as contract workers. Contract work will appeal to individuals. We think corporations want contract work. It is actually the employees, or the people who have the knowledge and simply say, 'I don't want to work for you. I don't want a boss anymore.' In other words, in the knowledge age, the 'gig' economy will grow.

The third one is the rise of the conscious capitalism movement. It began with a book that my colleague and I wrote, called *Firms of Endearment*, where we talked about shareholder value obsession being a very short-lived phenomenon. Well-

established companies were seldom shareholder driven, they were stakeholder driven. I observed that when I went to visit corporate headquarters located in small towns like Koehler which manufactures sanitary appliances such as toilets. I was advisor to Whirlpool Corporation, which is headquartered in a small town called Benton Harbour, Michigan, where the owners live in the same community, and every Sunday the church is a great equaliser. You are not above God, no matter who you are. You are more respected, and you are given the front seat, but still you are not above God.

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New York to be part of the capital markets and have been corrupted by them. It is not the corporations which corrupt themselves, it is the capital markets that corrupt corporations. Analysts take over your life.

The annual budget is still annual and predictable; but the CEO of a company does not know whether he or she will survive the next quarter. There is no predictability or job security at any level in a corporation, which again brings us to loyalty and bonding. So shared value creation, as Michael Porter has talked about, is becoming mainstream, where the sustainability goals become part of the agenda. Triple bottom line, as we call it generally, which is prosperity as opposed to profit; profit is becoming a dirty word, carrying the same negativism as the N word in America does today. In my opinion, the stock market has to use a different language and different measures, and the accounting system has to change from a governance viewpoint.

The next consequence for future management is greater empowerment with greater accountability. Empowerment reduces management overheads. It is very positive. People like to be in charge. They don't like the boss to tell them what to do again and again. Everyday nitpicking or oversight does not go down well with young people. So why not empower them? On the other hand, I find it fascinating that one-third of the people don't want to be empowered. The other one-third cannot be empowered because they are incompetent. The human resource policy states that you may start in the frontline, but then those who are good are moved up or promoted, and those who are left behind are less competent people. We invest less in frontline employees in terms of improving their skills. We have basically created a caste system between frontline employees and the management. How many CEOs have risen to be top of the corporation from the customer-support department, for example? Why is it that only one-third of frontline employees

are both willing and able? The reason is primarily our selection process. We think we can fix it by training, but it does not happen. I find that selection is much more important than training. How do we reverse the pyramid that the frontline is more respected in the organisation? The top management actually must serve the frontline. This is called servant leadership in the Christian faith. Servant leadership has many positive attributes and several corporations are now training senior leadership to become servant leaders rather than traditional bosses.

The next contour of management is that social media will replace the press media as the judge and the jury. And social media is more global than the press. This will change the scenario dramatically. Look at the rapid globalisation of the #Metoo movement. In every nation, and virtually in every corporation, people are waking up and saying, enough is enough. All of a sudden, you create a movement out of nothing through social media, which was not possible earlier through the press media, where there were editorial controls on what to print and what not to print. That is not the case with social media. This will have significant management consequences. And when social media becomes the judge and the jury, what happens to management?

I also believe that profit-sharing is an old idea; more and more people will demand revenue-sharing, because I can create profit optics through my accounting systems, by allocating costs. Revenue is more transparent. Take the Uber system, for example, in which the driver takes a percentage of the revenue. This is revenue-sharing, not profit-sharing. It has nothing to do with stock ownership. The old model of profit-sharing created during the industrial age is about to be replaced in the knowledge age.

The next contour of management in the knowledge age is that the style of

management will no longer be authoritarian. The position will no longer give me the power to do what I want with my employees and subordinates. The new style of management that leaders have to embrace is what I call the coach and mentor. Take the example of coaching in sports. Coaches are not in the limelight. It is the players. Coaches do not get paid as much as the players. Today's leadership wants to be in the limelight, not the people who do all the work. How you realise human potential is key. Several surveys have shown that the boss is hated at every level in the organisation. The vice-presidents hate the CEO, the assistant vice-presidents hate the vice-presidents, managers hate the assistant vice presidents, all the way down to the factory worker. Therefore, the new style of leadership is more likely to be adopted in the knowledge age.

The last point is that CSR (Corporate Social Responsibility) is not an afterthought. It is the way you do business every day and it is not a side activity either. It cannot be about guilt reduction, or what is called strategic initiative or strategic investment. In India, CSR is mandated and it generates about US\$5 billion of surplus that has to be invested for the community, employees, and environmental sustainability. Therefore, it becomes a part of doing business.

Finally, public policy will be more strategic than public relations and external affairs. Corporations recruit a team of specialists in PR and external affairs people. Public policy is more important. I have not seen anybody in a large organisation who is a Chief Policy Officer. There are some signs of large corporations engaging them. Suddenly, the shift is more towards public policy rather than managing politicians or regulators, for example.

Information technology will be like breathing air, it will be everywhere. And, of course, like any air, some of it may be more dirty than others. How do you make

sure that the air is cleaner—which means the data we collect and the data we store are authentic.

Let me conclude. Every technology influences and alters the contours of management. The industrial age altered the contours of production. The infrastructure age altered the contours of physical distribution and logistics.

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The information age altered the contours of commerce. The knowledge age will alter the contours of governance. Artificial intelligence, blockchain and social media will alter the contours of governance. Governance will shift from the hierarchical to the distributed. And from external governance by compliance, to more and more self-governance. The implications for the future of management will be enormous. Human capital will command a premium, contrary to all expectations. Contract work will become the new norm. Conscious capitalism will expand and redefine the purpose of business. There is a global movement underway where CEOs of companies are

beginning to understand they can't survive unless they give back to the society. It is not a one-way street, as many people have believed. The shareholder value obsession is only a 30-year detour. We will go back to the way family owned businesses located in small towns lived in the community. The shareholder value obsession, created primarily after the first energy crisis, will be replaced by shared value.

Finally, successful leaders will be those who embrace and use the coach–mentor style of leadership rather than the traditional ‘boss’ style of leadership and management. People will not work for you anymore if the traditional style of leadership persists. Here are the statistics. Today’s young generation is the future human capital. A rigorous search goes into one particular hire, you invest in the person, you invite him or her for interviews, you make an offer, the person joins you, and soon says, I want to leave. You conduct exit interviews and they say they just don’t like it here. No explanation. The first thing our students at Emory University want is to talk to the vice-president, not the recruiter. Then they ask, what are you doing for the environment? The boss who is going to hire you has no answer. And the young students simply say, why would I work for you? The change is just amazing. The mindset of youth today is so different, largely because they come from affluent families. I have found that in the United States, when they leave home after high school, their room can be never touched by the parents. They cannot convert it into an office or a gymnastic room, for example. The young generation wants to come back in between jobs. We call them the yoyo generation. They leave and they come back. They don’t worry about their livelihood, because they have a safety net at home. That changes their autonomy and their mindset.

So, the future of governance will be more distributed and more in the way of the mentor–coach style. The leader’s job is to make ordinary people extraordinary by unlocking the potential of the next generation of workers. This is not only good for the employees but it is also good business.

About the Author

Jagdish N. Sheth is Charles H. Kellstadt Professor of Business in the Goizueta Business School at Emory University. He is globally known for his expertise in consumer behaviour, relationship marketing, competitive strategy, and geopolitical analysis. Professor Sheth has over 50 years of combined experience in teaching and research at the University of Southern California, the University of Illinois at Urbana-Champaign, Columbia University, MIT, and Emory University. Professor Sheth is the recipient of four top awards given by the American Marketing Association. Professor Sheth is the recipient of an Honorary Doctorate in Science, awarded by the University of Illinois at Urbana-Champaign (2016), and Honorary Doctorate of Philosophy, awarded by Shiv Nadar University (2017). He has authored or co-authored more than 300 papers and several books. His latest book is *Genes, Climate and Consumption Culture: Connecting the Dots* (2017).

