Preface

Over the past several years, a new trend in doing environmental and social good has made its way in the technology industry. Software developers, engineers, and other technology specialists are taking their passion for technology and giving it purpose by making an impact on the world. They are doing this with help from a growing number of purpose-driven companies and organizations that use technology to solve problems that benefit society, not just boards of directors and shareholders. This shift across industries has developers, engineers, and companies working for good, not just for profit. And, this trend is catching. Even companies whose core business might not appear to be beneficial to society are looking at ways they can donate time and resources to projects that can make a difference.

This book is based on the anecdotes of several technical specialists and business owners, ourselves included, who have followed their own path in making a positive difference in the world. As you read these stories, you'll notice that pairing passion with purpose was easy for some people, but for others, it was more of a light-bulb moment. If you still haven't found your light-bulb moment, may you be inspired by their accounts. When you combine your passion and purpose, you have the potential to leave a lasting impression on the world. This book isn't about finding your passion and purpose but what you do with them to give back and help others.

The testimonials in this book affirm a new generation of engineers who are using their skills for greater environmental and social impact. Hopefully they will inspire you to set your own course toward making a difference and have a meaningful, positive impact on the world. This book is a tribute to the companies and engineers who have shared their stories about their mission to help guide you toward achieving greater self-fulfillment by giving back to the environment and society.

Chapter overview

This book includes the following chapters:

- **Chapter 1** briefly touches on the Third Industrial Revolution and how it has led to business and industry as a force for positive change. It then shares the viewpoints of our technology experts about how industries are helping to re-shape society and the environment.
- **Chapter 2** looks at benefit companies and B Corporations as influencers in the movement for good. It includes examples of how some of these companies that we learned about are helping to make an impact.
- **Chapter 3** spotlights the obvious driver in this movement—technology. It describes the software stacks and tools that our experts are using in their current environments and the challenges they see. It also points to such technologies as machine learning, virtual reality, and blockchain that are already making a difference in helping society and the environment.
- **Chapter 4** expands on the technology discussion by focusing in on the importance of collaboration, especially through open source, in helping to drive companies whose core mission is to make a positive impact.

- **Chapter 5** examines why IT professionals are choosing to work where they do and how they landed where they did in their current positions. It also includes our own Source Coder story and how we are giving back.
- **Chapter 6** explores the cultures of the companies that we learned about during our interviews for this book. Our IT specialists explain what motivates them to come to work every day, the teams they work with, and the incentives and perks of working for these companies.
- **Chapter 7** provides guidance from our experts on how companies, teams, and individuals can help make a greater impact on the world. They highlight key areas that can help to make a difference in the work that software developers and engineers contribute every day.

Panel of experts

When writing this book, we reached out to a broad range of people within the technology industry, from junior-level developers to founders and chief technology officers. Fortunately, we already knew and had worked with some of the people, which helped us get started. Other people came as recommendations during the course of our interviews. When you consider that our core business is recruiting in the technology industry, we know how to find good people.

Throughout this book, you'll learn the stories behind each of these technical professionals. They share in their own words what it means to be a part of this rewarding movement to give back to society and help care for the environment. They also explain the type of work they do, the technology they use, and their viewpoint for where these companies are heading. This book would not be possible without their thoughts, experiences, and insights. A special thank you goes to the following people:

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- Kevin O'Brien, Chief Technology Officer, Kiva
- David Siegal, Software Engineer
- Mark Horlbeck, Director of Products, CauseLabs

About the authors

Richard Blackledge is the Co-Founder and Chief Operations Officer for Source Coders. Originally from Leeds, England, Richard moved to the Los Angeles area in 2004 having been given the opportunity to work for a non-profit organization that were doing groundbreaking work in the alternative energy space. Out of college, Richard had aspirations of playing professional cricket and was signed to Yorkshire CCC. After an injury permanently curtailed his sports ambitions, he opted for the entrepreneurial route in line with his passions, ultimately landing him in Los Angeles. He has founded publishing, media and ecommerce companies prior to starting Source Coders. Richard serves on the board of directors for several nonprofit associations. He is also passionately involved in youth and senior-level sports as an administrator, assessor, and at times as a coach.

Stephen South is the Co-Founder Chief Executive Officer of Source Coders. Stephen is originally from Cape Town, South Africa, and has a degree from South African College School. He began his career as an analyst software developer for Recom IT Solutions. Two years later, he joined Huntress in London, England, as an associate recruiting consultant and open source specialist. In 2010, he relocated to the Los Angeles, CA, area, where he co-founded Bridge Noble IT and led talent acquisition for technical engineering. In 2016, he left Bridge Noble to launch Source Coders. Stephen is also the founder Head Start Children's Foundation, which helps underprivileged children in South Africa find self-confidence and passion through a variety of activities that they would otherwise not have access to.

Jenifer Servais, the writer for this book, is the owner and Editor in Chief of j.servais | creative content. She has worked over 25 years in the technology industry, including almost 20 years working in publishing and marketing for areas for IBM. She has trained writing and editing teams in the US and India and has written for and edited the works of several technical authors around the globe. She has won several awards from the Society of Technical Communication and is a member of the Editorial Freelancers Association.

Chapter 1: Industries as a force for positive change

Almost every aspect of modern life is impacted by technology. For many of us, life has always been this way. While many processes are cyclical, technology is always progressive: from simple hand tools created by early humans, to mechanical and agricultural tools that advanced early societies, to the invention of power generation and communications, right up to modern day computers. These tools, these inventions, this technology have determined the direction of society.

Modern society is almost completely dependent on technology. Mobile phones have advanced our communication. The invention of the Internet has expanded our knowledge base and connectivity. Through this invention, the world has become smaller, connected, as humans learn much more about it and develop virtual communities. This global technological connection enables us to make more informed decisions to determine the direction of society. And, in the modern world, the majority of leading technologies are run by code.

As we dug deeper into the force behind this book, we came across the insights of renowned social and economic theorist Jeremy Rifkin who has written and spoken extensively about the Third Industrial Revolution. In one documentary, Rifkin spoke about a new way that the economy can address "climate change and create a more equitable and empathic world."[i] In looking at the scope of our book and the people we interviewed, it's not just the economy, but the people and companies who move it that are committed to creating a beneficial impact on society and the environment.

In this chapter, we examine the Third Industrial Revolution and what it means for business and industry in terms of forcing a positive change. We also learn how our technology experts see industries playing a role in shaping society and the environment for greater benefit.

The problem with financing a digital transition isn't the money but what we do with the money. What we do is tied to our values for freedom, power, and community.

The Third Industrial Revolution

In an article for *Foreign Affairs* in March 2006, American economist Alan S. Blinder wrote about the dawn of the Third Industrial Revolution.[ii] The information age had made its entrance into the global economy, but offshoring was giving companies a boost in making economic and social advances.

Then, in 2011, a more definitive perspective came into focus when economist Jeremy Rifkin published his book *The Third Industrial Revolution: How Lateral Power Is Transforming Energy, the Economy, and the World*.[iii] The Third Industrial Revolution is a technology transformation into a digital

revolution. Rifkin says that it could "be so powerful in its potential productivity that it could actually reduce the marginal cost for some goods and services to near zero." For businesses and communities, that means a lot. For the environment and society, that means everything.

In a 2018 documentary, Rifkin talked about an economic roadmap for how this Third Industrial Revolution could slow climate change, link global economies, and unite communities around the world. He explained that, through each of the Industrial Revolutions, the Communications, Energy, and Transportation industries "emerge and converge … to create … a new infrastructure that fundamentally changes the way we manage and move economic life." [iv]

For example, in the First Industrial Revolution, which started in Great Britain, steam-powered printing replaced manual print presses to quickly mass produce printed items. Then, telegraph systems provided a way for people to transmit messages over a wire, versus delivery by a posted letter. Both steam powered printing and the telegraph converged with coal mining. Coal was harvested by using a steam engine, which was then put on rails, inventing the locomotive to aid in transportation. The Second Industrial Revolution, which was led by the US, gave way to centralized electricity, allowing for the invention of the telephone, radio, and television, and even computers and the Internet. Early in the 20th Century, these communication and energy methods merged with crude oil to power the invention of cars and trucks. This revolution peaked in July 2008 when crude oil hit a record price of US$147 on the world market. As a result, financial markets crashed, shutting down the global economy.[v]

Now, in the Third Industrial Revolution, digital communication is possible thanks to the Internet, which is converging with a renewable energy and automated GPS. We now have three internets—communication, renewable energy, and automated transportation logistics—in one internet to manage, power, and move economic life. The IT industry is leading this Third Industrial Revolution, with the areas of Internet of Things (IoT) and big data and analytics paving the way. Sensors are becoming part of everything—from cars, stop lights, and street lights, to medical and personal devices, to smart buildings and homes—to enable data collection and analysis for more efficient, economical, collaborative, global, and environmental solutions.

For example, an article in *The Economist* in April 2012 gives an example of the digitization of manufacturing:

> The old way of making things involved taking lots of parts and screwing or welding them together. Now a product can be designed on a computer and "printed" on a 3D printer, which creates a solid object by building up successive layers of material. The digital design can be tweaked with a few mouse clicks. The 3D printer can run unattended, and can make many things which are too complex for a traditional factory to handle. In time, these amazing machines may be able to make almost anything, anywhere—from your garage to an African village.[vi]

Rifkin says that the problem with financing a digital transition isn't the money but what we do with the money. What we do is tied to our values for freedom, power, and community.[vii] Where freedom used to mean a sense of independence and autonomy, it now means inclusivity. Where power used to mean top-down management from one person to many people (a pyramid), it is now lateral, based on networking and how we benefit each other, such as how open source applications work. And,

where community used to mean autonomy and sovereignty, it now is more of a biosphere focus across people, groups, cities, states, and nations around the world.

We have seen these changes in values in the stories and viewpoints from our technical specialists that we interviewed in for this book. The question now is not: what we will do with the money? Rather, it's: how will we use our technical and coding skills to help stop global warming, protect our environment, and enable others who have less to find a sense of self and independence through economy?

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In the next sections, our experts take you through their own experiences and observations of which industries they see as leading the way in giving back toward a brighter future.

Banking, finance, and farming for future markets

Kevin O'Brien

Any industry that is opening up data is making a big difference. Banking and financial services, which is where Kiva is, have great potential. Part of the problem of getting capital to the people who are under banked or don't have bank accounts now is that banks don't have the data to assess the risks of lending to people. When that data becomes available, the data transactions turn into digital transactions right over a person's phone, building a credit history.

If banking and financial companies then open up that data to the world, suddenly there's access to this whole market. That potential exists outside of financial services, too. You see it now in the real estate industry. For example, Zillow and similar realty companies are making it easier for people to find the home they're looking for, not just a house.

Farming is another industry where people can use data. For example, farmers can keep track of how much water, fertilizer, grain, or supplies that they are using and then share this information with others. They can also track weather patterns and temperature from day-to-day, month-to-month, and year-to-year. By gathering, tracking, and analyzing this data, farmers can improve their output or harvest. The data sharing aspect of automation in the farming industry is quite exciting. If farmers can grow crops using an organic method that works better than using fertilizers, they can save the money that they would spend on fertilizers to grow more crops.

I've seen this method work already with a partner we work with called One Acre Fund, which finances and trains small-holder farmers. This company has had a lot of impact in Sub-Saharan Africa by sharing data and is considered a leader in that area. The US also has a few entities, such as *FarmLogs*, which offers an application to help farmers expedite crop management decisions.

Sharing data and getting that information out to the world will be extremely valuable in how we code and build for the future.

Education for future leaders

David Siegal

The Education industry can amplify educational goals and momentum by developing applications to support them. For technology in education to be successful, it has to be a part of a time-honored solution that includes support and buy-in from school administrators, teachers, parents, and the community. When you have that level of support and technology together, you get the best results.

Technology is already making its way into communities around the world, in both developed and underdeveloped areas. The people who receive it are eager to use it; they're willing to invest the time to learn it, use it, and support it. Unfortunately, when schools don't have sufficient support to set up new technology when it arrives, it can end up in a closet collecting dust. The key will be for companies to provide that support: virtually, on-site, or through technical documentation.

Here, in the US, I've seen two different sides of EdTech (education technology). One side is where large institutional players, such as Harcourt and Scholastic, have moved from traditional publishing and brought technology into the classroom. These projects tend to be fairly large that involve years of ramp up and a lot of financial investment. They tend to be lower risk with a modest reward probably because these companies incorporate a mix of existing educational models that they supplement with technology.

On the other side are the start-ups, where people take a moon-shot approach to technology. Some of them flop, but some of them do incredibly well. For example, Khan Academy was started by Sal Kahn, an engineer who helped tutor his cousin in math. Now, Khan Academy is one of the most highly used educational resources in the world. It's completely free to educators and is a 501(c)(3) nonprofit.

We need both of these types of players—the large institutional players and the nonprofits. When schools have to make an investment, they should have a variety of conservative approaches to incorporating technology. This method is particularly true for schools that might be in a more desperate situation and need to try more novel options. In all of these cases, companies invest as much money into studying outcomes as they do in building the actual software because they must have confidence that their solution will benefit children through their education.

In the area of education, you always have to proceed with caution because you're talking about the future of our children. You have to temper more daring ideas that can have negative affects with ideas that are more practical and have more positive effects.

Technology industry for communities

Mark Horlbeck

From my experience, it's interesting to see just what we've done as part of the IT industry. Several years ago, we worked on a faith-based project. The organization that we worked with provided a high quality and diversified set of audio Bibles in various languages around the world. We collaborated

on developing an application programming interface (API) and a big database to help the organization manage all the digitized formats of its books, including different languages and versions. We brought it all together with an app that allowed users to do what many Bible apps now do. You can select what you want to hear in the language and versions you want to hear it in and even use it for personal Bible study. In the time that we worked on this project, the access that people now have to that sort of material has skyrocketed.

It's been amazing to see the disruption this industry has made in the way that we can use technology to do some really cool things. A lot of other pieces play into it, such as audio, visual, sensor, and satellite formats. In general, we're seeing the connectedness of everything. Now that we have the Internet and so many devices to communicate with one another, it's rewarding to see how technology is changing people's lives today for the better. It automates manual processes, giving people more time to focus on, or enjoy, other things. It can make managing various aspects of our health and lives easier. For example, we now have wellness apps and monitors to help ensure we get enough exercise, track our diets, and manage health conditions. They enable us to make better decisions to help prolong our health so we can have longer, fuller lives.

This disruption also coincides with some projects we've worked on, particularly in regard to the technologies that are becoming available in third-world countries for water delivery systems. The interesting part of it is not necessarily the technology. Rather, it's how the technology affects the communities that have never been exposed to it before and how it is changing those communities for the better. There are a lot of challenges in getting these communities to take ownership of the technology and help them to understand how to maintain it. We need to show them how to use technology to improve their own quality of life through the different perspectives of technology than just using it. For example, we need to show them how it provides access to clean water and the value of having that clean water to avoid illness and disease. We need to show them how they can use it to build and establish infrastructure within their communities for greater commerce, communication, and transportation.

Industry start-ups for the environment

Leon Miller-Out

I don't see a specific industry that's making a big impact on society and the world. Rather, I see a trend where a lot of start-ups are building innovative products in what they bring to underdeveloped areas. For example, some people are building solar powered lights for places that have little electrical infrastructure. A lot of the more advanced technology is being used to solve first-world problems that aren't really pressing problems.

Virtual reality can provide a way to teach empathy. For example, people can use it to immerse themselves in experiences other than their own and learn about other people's perspectives. The media is another way to bridge communication gaps within and across countries around the globe.

We are making progress with renewable energy and solving real problems thanks to work done by solar and energy companies, particularly with clean energy businesses. Just in upstate New York, a lot of development money is focused on clean energy start-ups, which hopefully will move fast enough to help to alleviate climate change.

Final thoughts

The Third Industrial Revolution is upon us. As we look toward building a brighter future, it's not one industry that's taking the lead, but the work of many that are making a difference. At least according to our team of IT specialists, they see banking, finance, farming, and education playing a big role in making a difference for society and the environment. Also the many start-ups within those industries have tremendous potential to make great strides in building stronger communities and preserving the Earth. Bob Freitas says he doesn't see Fortune 500 companies blazing the trail. "More of the smaller companies are interested in this area and able to pursue it, because they don't have to keep shareholders happy every quarter."

There's certainly some truth in that. But, one common factor in all industries that will help to build a brighter future is technology. Being in the technology industry, the developers, programmers, and engineers of today and the future have a lot of work to do and a lot of personal reward in self-fulfillment to gain.

[i] Jeremy Rifkin (February 2018). *The Third Industrial Revolution: A Radical New Sharing Economy*. Vice Impact documentary. Available at: https://impact.vice.com/en_us/article/bj5zaq/watch-vices-new-documentary-the-third-industrial-revolution-a-radical-new-sharing-economy

[ii] Blinder, Alan S. (March/April 2006). Offshoring: The Next Industrial Revolution? *Foreign Affairs*. Available at: https://www.foreignaffairs.com/articles/2006-03-01/offshoring-next-industrial-revolution

[iii] Rifkin, Jeremy (2011). *The Third Industrial Revolution: How Lateral Power Is Transforming Energy, the Economy, and the World*. Palgrave Macmillan Trade.

[iv] Jeremy Rifkin (February 2018). Ibid.

[v] Jeremy Rifkin (February 2018). Ibid.

[vi] "The third industrial revolution: The digitisation of manufacturing will transform the way goods are made—and change the politics of jobs too." The Economist, 21 April 2012. Available at: https://www.economist.com/node/21553017

[vii] Jeremy Rifkin (February 2018). Ibid.