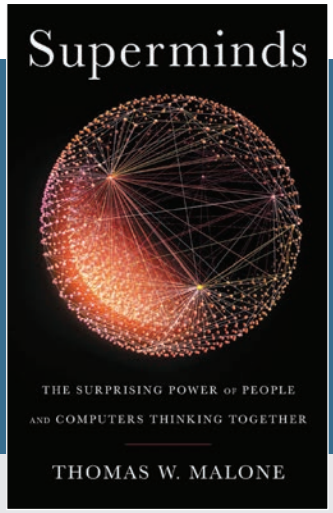

Superminds

The Surprising Power of People and Computers Thinking Together

By Thomas Malone, the Patrick J. McGovern Professor of Management at the MIT Sloan School of Management and 2022 Next Practice Institute Annual Gathering Keynote speaker

According to *Superminds*, while much has been promised about the rise of artificial intelligence, in the immediate term the greatest contribution computers will make to our collective ability to solve complex problems, will be *hyperconnectivity* – how computers link human minds together in unprecedented ways. In particular, how human-computer superminds will outsmart anything we have seen before.

"Many believe that humans are the most intelligent animals on our planet. But there's another kind of entity that can be far smarter: groups of people. In this groundbreaking book, the author shows how groups of people working together in superminds (the combination of many minds) – in the form of a hierarchy, marketplace, democracy, or community – have been responsible for almost all human achievements in business, government, science, and beyond. And these collectively intelligent human groups are about to get much smarter.

Using dozens of examples and case studies, Malone shows how computers can help create more intelligent superminds simply by connecting humans to one another in a variety of rich, new ways. And although it will probably happen more gradually than many people expect, artificially intelligent computers will amplify the power of these superminds by doing increasingly complex kinds of thinking. Together, these changes will have far-reaching implications for everything from the way we buy groceries and plan business strategies to how we respond to climate change, and even for democracy itself. By understanding how these collectively intelligent groups work, we can learn how to harness their genius to achieve our human goals.

Drawing on cutting-edge science and insights from a range of disciplines *Superminds* articulates a bold picture of the future that will change the ways you work and live, both with other people and with computers."

An overview from the publishers

Introduction

In January 2009, Tim Gowers posted a blog entry that would make history. Gowers is a mathematics professor at Cambridge University, and he proves mathematical theorems for a living. If you're like most people, you probably haven't proved a theorem in your life, or at least not since high school geometry class. But the rigorous, logical thinking that is captured in mathematical proofs is at the heart of many of humanity's most important scientific and technological achievements.

Usually, proving theorems requires hours of solitary work, trying to figure out how to do just one piece of one subpart of a complex proof. In 2009, Gowers decided to try a different way of doing things. He wanted to see if a large group of people on the Internet could prove a theorem together.

"The test of leadership is not to put greatness into humanity, but to elicit it, for the greatness is already there."

– James Buchanan

In a blog post titled "Is Massively Collaborative Mathematics Possible?" Gowers invited anyone on the Internet who was interested to collaborate in proving the theorem. He speculated that this kind of large-scale collaboration might be useful for at least three reasons. First, in many kinds of problem solving (including mathematical proofs), luck often matters. Having many people working on a problem increases the chances that at least one of them will get lucky and have an important idea.

Second, different people know different things. So even if everyone just contributes ideas that seem obvious to them, the group as a whole can bring to bear much more knowledge than one or two individuals ever could alone.

Finally, different people think differently. Some are good at coming up with new things to try, others at finding the faults in someone else's ideas, still others at putting together lots of pieces into a coherent new picture. As Gowers summarized, "... if a large group of mathematicians could connect their brains efficiently, they could perhaps solve problems very efficiently as well."

The post went on to suggest ground rules to make the collaboration easier, such as keeping discussion respectful and making only bite-sized, focused contributions. In a subsequent post, he gave his group the task of proving the Hales-Jewett theorem, which is part of an esoteric branch of mathematics that has applications in computer science and other fields.

Other mathematicians quickly took up his challenge. Within seven hours after Gowers put up his blog post, the first comment was made by Jozsef Solymosi, a mathematician at the University of British Columbia. Fifteen minutes later, Jason Dyer, a high school mathematics teacher in Arizona, made the next comment. Three minutes after that, another comment came from Terence Tao of UCLA (a winner, like Gowers, of the Fields Medal, the equivalent of a Nobel Prize in mathematics).

By mid-March, the participants had solved the core of the problem. By the end of May, there had been over 1,500 comments in which 39 different people made substantive contributions. And in October, the group submitted the first of several articles describing their results, all of which were attributed to "D. H. J. Polymath," a pseudonym for the whole group.

With all the famous mathematicians involved, you might wonder whether this was really a group project or whether the key work was done by a handful of the most prestigious contributors. It's true that some members of the group contributed much more than others, but a detailed analysis of the complete working record of the project shows that almost every one of the 39 substantive participants contributed influential content.

In other words, the Polymath project made history as the first example of a real contribution to mathematics from a loosely organized group of dozens of people on the Internet, many of whom didn't even know each other before the project started.

What's Old Here?

The Polymath project was successful because it used new information technology (IT) to connect people in ways that would never have been possible before. We'll see many more such stories in this book: vast online groups creating an encyclopedia (Wikipedia), solving

difficult scientific problems (Foldit), entertaining each other with gossip (Facebook), and responding to humanitarian disasters like hurricanes (Ushahidi).

But in a sense, these digital-age accomplishments are all just examples of one of the oldest stories in the history of humanity. The story goes like this: "There was a problem. Different people worked on different parts of it. Together, the group solved the problem better than any of the individuals could have solved it alone."

In fact, it's not too much of an exaggeration to say that almost all our important problems are solved by groups of people rather than by individuals alone. For instance, it may be a common shorthand to say that Steve Jobs created the iPhone, but of course the iPhone was really designed and made by thousands of people all over the world who in turn built upon a vast edifice of technological inventions that came before them. Even making the turkey sandwich I had for lunch today required hundreds of people to grow, transport, and prepare the meat, bread, lettuce, mustard, and other ingredients.

Compared to "simple" problems like these, trying to solve big societal problems like what to do about climate change, crime, war, poverty, health care, and education is far more complex and requires far more people.

One name for the ability to solve problems well is *intelligence*, and we usually think of intelligence as something that individuals have. But as all these examples make obvious, intelligence—in the sense of solving problems well—is something that groups can have, too.

We'll call the intelligence of groups *collective intelligence*, and this book is the story of that ubiquitous—but often invisible—kind of intelligence. We'll see that it was the collective intelligence of human groups, not the intelligence of individual humans, that first differentiated our human ancestors from all their animal relatives. We'll see that human progress has been mostly a story of what groups of people—not individuals—have accomplished. And we'll see that, over time, information technologies—like writing and the printing press—allowed groups to become dramatically larger and more intelligent.

Most important, we'll see that we are now in the early stages of another dramatic change in collective intelligence, this time enabled by new electronic information technologies. ■

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Professor Malone predicted in an article published in 1987 many of the major developments in electronic business over the following 25 years, including electronic buying and selling for many kinds of products. In 2004, he summarized two decades of his research in his critically acclaimed book, *The Future of Work*. In addition to his books, including *Superminds*, he has published over 100 articles, research papers, and book chapters and is the co-editor of four books.

He has also been a co-founder of four software companies and has consulted and served as a board member for a number of other organizations. He is an inventor with 11 patents.

His background includes work as a research scientist at Xerox Palo Alto Research Center (PARC), a PhD from Stanford University, an honorary doctorate from the University of Zurich, and degrees in applied mathematics, engineering, and psychology.