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Brian K. Werdesheim is a founding member of The Summa Group of Oppenheimer & Co. Inc., a private client financial advisory team that provides wealth management services for affluent individuals and families, as well as owners and executives of private and public companies, family estates, charitable entities, and some of the top tax and legal professionals who serve the business, athletic, and entertainment communities. Werdesheim graduated from the University of Southern California with a bachelor of science in business administration. He also attended the University of California, Santa Barbara and Richmond College in London, England. Werdesheim lives in Studio City with his wife and their daughter and son. In his off time, he enjoys travel, golf, running, and participating in other outdoor activities. Brian has served on the Board of The Fulfillment Fund since 2003. He founded The Banyan Foundation in 2004 (formerly The Summa Children’s Foundation). Werdesheim serves on the Advisory Council for the Greif Center for Entrepreneurial Studies at The University of Southern California and served as a Trustee at the Buckley School May 2016-2019.

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THE INDUSTRIAL REVOLUTION IN THE 21ST CENTURY

How artificial intelligence, machine learning, and big data convergence creates disruption and opportunity

The proliferation and integration of artificial intelligence (AI), machine learning, and big data is being called the fourth iteration of the Industrial Revolution. As with any disruptive force of this magnitude and long-term impact, there will be many winners and losers; many investment careers will be shaped by how individuals choose to participate in this revolution. As advisors to executives, private equity professionals, company founders, and others whose futures are tied to their ability to adapt and evolve, our team is immersed within the executive ranks and the companies helping shape the future.

Artificial Intelligence Is Not A New Concept

The history of AI dates back to ancient times. Thinking machines and artificial beings have appeared in the myths of most major civilizations for centuries, while philosophers and mathematicians have been developing mechanical or “formal” reasoning for ages. Since the 1960s, two booms in AI have occurred, each followed by a period of slower progress. Currently, progress with machine learning and deep learning is driving an increase in AI diffusion.

The broad field of AI is the science of making machines or software smart. The phrase was coined in the early 1950s by American computer and cognitive scientist John McCarthy, who defined it as “the science and engineering of making intelligent machines.” AI has become an essential part of technology and is increasingly doing the heavy lifting on the most challenging problems in computer science.

Our Connected Society Can Access and Decipher Big Data Like Never Before

We are living in an exponential age, where ubiquitous connectivity and decreasing costs are leading to the digitization of most activities. The size of the digital universe is at yottabyte (10^{24}) level and 90 percent of the world’s data has been created in the past two years. The data created is projected to double every two to three years, with over 1 trillion connected devices by 2035. The untapped potential is huge given that less than 1 percent of data generated has been analyzed. AI will play a vital role in deriving new insights from this data and the new digitally connected economy.

QUOTE:**THERE WILL BE MANY WINNERS AND LOSERS; MANY INVESTMENT CAREERS WILL BE SHAPED BY HOW INDIVIDUALS CHOOSE TO PARTICIPATE IN THIS REVOLUTION.**

Big data and AI are as foundational as the internet and smartphones. IT-driven productivity has the potential to boost global GDP by \$15 trillion by 2035, \$3 trillion to \$5 trillion in economic value annually (according to Bank of America/Merrill Lynch), including a reduction in emissions, increased productivity, and improved healthcare. AI will be the single largest driver of tech spending over the next decade.

The scarcity of available labor resources is likely to significantly accelerate tech infrastructure investments to further boost productivity. During past labor shortages, tech spending spiked, and it is estimated to rise to 5.5 percent of GDP from the current 3.5 percent (BOA/Merrill Lynch). Recent breakthroughs in AI and machine learning are accelerating transformation. Computers are learning by themselves; software writes software, and algorithms write algorithms. The computer error rate in image recognition dropped to 3 percent in 2016, below the human error rate.

A Profound Impact On Our Workforce

Major challenges remain in harnessing the power of big data. In addition to privacy and cybersecurity risks, transforming into a digital business requires dramatic changes in skills, technology, organizational structure, and sometimes fundamental business models. Today the No. 1 barrier to adopting big data is the organization's existing structure (54 percent of respondents), followed by resistance to change (52 percent) (according to Harvard Business Review). Around 70 percent of companies face a gap in integrating IoT (Internet of Things) into their existing business workflows (McKinsey 2017).

Though still scaling up, big data is as foundational today as the Internet was in the 1990s, and mobile phones were in the mid-2000s. Beyond the hype of the recent past, we believe its breadth of adoption and influence are only starting to be felt. Alongside future mobility, the cloud, and social media, big data is at the heart of the global digital transformation and emerging technologies, such as machine learning, IoT augmented reality (AR), intuitive interfaces, autonomous vehicles, cognitive experts, and virtual assistants, with more to come. New business models such as the sharing economy, on-demand, and everything-as-a-service are also predicated on access to large data sets.

The impact of the big-data economy will sweep through all industries, leaving disruption in its wake. According to a 2017 Harvard Business Re-

view global survey of executives, an estimated 7 out of 10 respondents believe that their company has already passed the inflection point of disruption or will pass it by 2020. Around half believe their company's traditional business model will be obsolete in three years. The average tenure for companies in the S&P 500 has been shrinking, from 33 years in 1965 to 20 years in 1990, and this is forecast to shrink to 14 years by 2026. Up to 50 percent of S&P companies could be replaced in the next 10 years (Innosight). Challenges will vary from sector to sector, with digital-native tech companies the most prepared for the data revolution (70 percent with formal digital strategies), versus healthcare (34 percent) and government (27 percent) (Harvard Business Review).

Making Sense Of The Opportunity

Inevitably, an enormous amount of capital will flow into companies perceived to be best positioned to leverage this wave of technological innovation. While the fatality rate will be high, we will also have the Amazons, Facebooks, and Apples of this revolution and everything in between. An investor has many options when considering how to proceed. Index funds/ETFs, one-off private equity investments, private equity funds, and individual stocks are a few of the ways investors will deploy capital. Each has a vastly different risk profile so be mindful of the associated risks, liquidity, and volatility. Today, many well-funded and successful private companies are choosing to stay private and not pursuing IPOs. As a result, there are more mature privately held companies that represent viable opportunities. Thus, we are looking to invest with proven portfolio managers in the public and private sectors. Considerations for clients will always focus on liquidity, fees, transparency, diversification, and leverage before making a determination about how best to invest in this opportunity.

Our lives and future generations will be impacted in ways we cannot imagine by this perfect storm of big data, machine learning, and AI. We hope the quality and duration of our lives is positively impacted while creating wealth through thoughtful, prudent, and strategic investing. **END**

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