

Klaus Schwab, *The Fourth Industrial Revolution* (World Economic Forum, 2016, 157 pp.)

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Book Review

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In 1969, NASA's historic moon landing marked a monumental achievement in human history. Key to this success was the Apollo Guidance Computer (AGC), boasting a peak performance of 12,250 FLOPS (floating point operations per second). Just sixteen years later, the CRAY-2 supercomputer emerged, boasting an impressive 1.9 billion FLOPS. Fast forward to 2020, Apple introduced the iPhone 12, featuring a measured peak power of 11 trillion FLOPS. To contextualize these advancements, the iPhone 12, a ubiquitous handheld device in contemporary society, surpasses the computational prowess of the main computer used in the first moon landing by approximately 900 million times.

Additionally, it outpaces the CRAY-2 supercomputer, pivotal in oceanic exploration and nuclear research for the United States Department of Defence and Energy, by a factor of roughly 5000. Such extraordinary achievements underscore the rapid pace of technological progress. Notably, the accessibility of cutting-edge technology today contrasts sharply with the substantial investments required in the past. While the CRAY-2 commanded millions, the most formidable iPhone 12 model is available for just over \$1,000.

Klaus Schwab is an economist and engineer who also doubles as the founder and the executive chairman of the World Economic Forum (WEF). The WEF is a platform renowned for bringing together leaders across the world to shape regional and industrial conversations. Klaus Schwab is also the founder of several other foundations aimed at shaping the global future by facilitating interactions.

Klaus Schwab's concept of "The Fourth Industrial Revolution" aptly captures this era of unparalleled technological advancement reshaping society. The unprecedented pace, scope, and intensity of these transformations herald a new chapter in human history, worthy of its description as the fourth industrial revolution.

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Schwab's introduction section is a compelling prologue to the profound changes underway in our world. These changes include the breakthroughs witnessed across diverse fields such as AI, robotics, and biotechnology. While Schwab outlines the transformative potential of this technological revolution, by stressing its unprecedented scale and complexity, he also acknowledges the challenges that these advancements could pose to our existence as humans. Schwab emphasizes the need for collaborative efforts to navigate this inflection point, and in addition clearly outlines his objectives for the book: increasing awareness of the on-going revolution, providing a framework for understanding it, and fostering cooperation among the key stakeholders for the common good. Overall, Schwab's introduction sets an inspiring tone for the exploration ahead, urging readers to engage actively in shaping our collective future. The book is segmented into three chapters after which a segment titled “The Way Forward”, an “Acknowledgements” section, then an Appendix section follow.

The opening chapter begins with a contextualisation of the ongoing revolution from the perspectives of past revolutions that have occurred; from the Agrarian revolution to that of the digital age. He then proceeds to elucidate the pivotal role of digital technologies, artificial intelligence, and the interconnected systems in driving this new revolution. The chapter proceeds with Schwab enumerating some concerns he thinks may limit our ability to harness the benefit that the burgeoning revolution brings while also highlighting the need for visionary leadership and institutional frameworks to overcome those concerns. He then continues to highlight the disruptive impact of automation, digital platforms, and AI on labour markets and socioeconomic structures. Schwab also addresses the challenge of rising inequality, emphasizing the imperative of fostering inclusive growth and equitable opportunities.

The second chapter delves into the core catalysts of the fourth industrial revolution, drawing on research from the World Economic Forum to categorize and explore these pivotal factors. These are the physical manifestations of technological advancement – autonomous vehicles, 3D printing, advanced robotics, and new materials. From the potential of drones in various sectors to the revolutionary capabilities of 3D printing in manufacturing and healthcare, each innovation is dissected to reveal its transformative impact on society. The author then highlights the megatrends in the digital realm as a bridge between the physical and biological domains, with the Internet of Things (IoT) facilitating seamless connectivity and data exchange. The discussion extends to blockchain technology and the burgeoning on-demand economy, highlighting their disruptive potential and the shift in consumer behaviour they entail. Biological innovations are then explored as the third megatrend. From the groundbreaking

advancements in genetic sequencing and editing to the potential of synthetic biology, Schwab navigates through the ethical and practical implications of these developments with nuance, highlighting the positives and the ethical questions that the emergence of precision medicine and the prospect of designer babies raise about the future of healthcare and human evolution.

Throughout the chapter, Schwab underscores the dynamic nature of innovation and the importance of fostering a conducive environment for research and development. By addressing the challenges and opportunities presented by each megatrend, the book provides a roadmap for navigating the Fourth Industrial Revolution and harnessing its full potential. The final section of the chapter concludes by discussing tipping points, which are practical applications of technologies from the fourth industrial revolution expected to become mainstream by 2025, based on a survey. It includes the percentage of respondents anticipating these shifts, providing insight into the imminent changes brought about by technological advancements.

The third and final chapter of the book thoroughly examines the profound impact of the ongoing revolution on societies, economies, businesses, and governments, providing comprehensive insights into its far-reaching implications. The discussion on the economy provides a balanced view of the potential benefits and challenges of technological advancement. It highlights opportunities for enhanced productivity and market integration amid concerns about income distribution and demographic shifts. The analysis of demographic trends and productivity paradoxes underscores the need for adaptive policy responses to mitigate potential growth constraints. The exploration of employment dynamics sheds light on the dual effects of automation on job displacement and creation. The chapter further explores the impact of the revolution on labour force skills, the on-demand economy, national and global security challenges, inequality and the middle class, and individuals.

The book employs special boxes to explore critical aspects of this transformative era. Box A delves into the dynamics of gender disparities that could characterise this revolution, highlighting the need for inclusivity and equal opportunities. Box B focuses on environmental sustainability, emphasizing the unique opportunity that the integration of the various drivers of the revolution present in achieving a circular economy, thereby promoting sustainable development. Box C discusses the evolving job market due to digital technologies, taxation challenges in the on-demand economy, liability issues in disrupted industries, privacy concerns amid data proliferation, and the importance of internet access for economic participation. It emphasizes the need for agile governance to address these changes and ensure inclusivity while managing power imbalances arising from information asymmetry. Urban innovations take

centre stage in Box D, showcasing how innovation can shape more efficient and liveable cities. Box E explores how technology and globalization are reshaping human movement influencing life choices and labour markets, while Box F delves into emerging technologies' impact on international security. Box G discusses the polarizing impact of technological advancements on citizen empowerment, highlighting how individuals and groups may feel both empowered and disempowered in civic life and governance. Box H explores ethical challenges arising from rapid technological progress in biology and artificial intelligence. Finally Box I, discusses the delicate balance between wellness and privacy boundaries in this digital age using wearable devices.

Overall, the book provides valuable insights into the opportunities and challenges of our rapidly evolving world. Schwab's vision for a human-centred approach to technology and innovation offers a roadmap for harnessing the potential of the fourth industrial revolution for the benefit of all in mostly simple and lucid language.

Although the book brings to fore several essential points, perhaps it is too premature to refer to these changes as a revolution just yet. In the second chapter of the book, Klaus relies on tipping points from a World Economic Forum report from 2015 to give a practical sense of the celerity of the changes he is referring to. The tipping points are a presentation of significant technologies expected to hit mainstream society by 2025 as determined by experts in the IT sector. With less than a year to 2025 and eight years after the publication of Klaus' book, these 21 tipping points presented in his book have still not been realised. This underscores that perhaps the author was a bit overenthusiastic in labelling the ongoing progress as a new revolution.

Furthermore, the author attributed the changes illustrated in the book as resulting from technology. This is perhaps an oversimplification of the causes of the advancements in society, perhaps a perspective more convenient for the author as an engineer and a technology enthusiast. By ascribing the changes to technology, Klaus ignores all other influences of change in the world such as the need to adapt, social and cultural trends, to mention but a few. For instance, the book highlights significant strides achieved in renewable energy technologies and attributes these to technology. However, one could also argue that these advancements are also the result of the need to mitigate climate change and its catastrophic consequences.

Moreover, it could have done better by delving a bit deeper into the problems. For instance, the book highlights the potential advantages and drawbacks of the on-demand economy, there was a lack of exploration of the structural inequalities inherent in the on-demand economy. Also, a

lot of the solutions provided in the book lack much clarity beyond encouraging collaborations among stakeholders and calling for policies and strategies that help mitigate the problems. However, collaborations by themselves do not guarantee solutions. The exposition would have perhaps benefitted more from some discussions on the directions in the collaborations should focus on.

Despite the few drawdowns of this book, it still is an essential read for policymakers, business leaders, and citizens alike, seeking to navigate the complexities of the new revolution and shape a more equitable, inclusive, and sustainable future. Once again, we find ourselves standing at such the crossroads of revolution. The choices we make as we head into the thick of the revolution will determine whether the revolution will lead us closer to our shared humanitarian goals or veer us off course. This book by Klaus Schwab can be considered one as setting a strong base for our first steps into the new revolution if we are to learn from the missteps of the past.