Preface

It is an open secret that US manufacturing has been on the decline for a long time. One after another, industries have either disappeared or shrunk. The semiconductor industry is no exception to this trend, and it is looking for new ways to overcome technological and economic barriers for sustaining its progress. The purpose of my book is to show that the revival of our manufacturing can occur only if America returns to a free-market system. The United States needs economic democracy, or what may be properly called mass capitalism, where a company's employees have a great say in how the company is run. Economic reforms to transform the present form of capitalism in the United States to a free-market system would help in sustaining the scientific progress in semiconductors and other industries. Mass capitalism would ensure robust growth in consumer demand through higher salaries for the middle class. To ensure a higher consumer purchasing power, mass capitalism recommends economic democracy in which wages of employees catch up with their productivity.

To ensure a free-market economy, *Mass Capitalism* believes that majority shares of Fortune 500 companies should be owned by their employees, rather than by outside investors on Wall Street. Additionally, the number of shares held by any employee should be in proportion to his or her productive contribution to the company. This would ensure that employees who work hard towards the success of the company would get a fair compensation for their hard work. In this way, mass capitalism guarantees a robust growth in consumer purchasing power to generate a higher consumer demand for all products, including electronic goods.

In 1965, Intel's co-founder Gordon Moore, in "Cramming More Components onto Integrated Circuits" in *Electronics* magazine (April 19, 1965), made the observation that, in the history of computing hardware, the number of transistors on integrated circuits doubles approximately every two years. This observation, called Moore's law, is now used in the semiconductor industry to guide long-term planning and to set targets for research and development.

The capabilities (processing speed, memory capacity, sensors) of many digital electronic devices have been improving at roughly exponential rates and are, thereby, strongly linked to Moore's law. This exponential technological improvement in electronic devices has dramatically enhanced the impact of digital electronics in nearly every segment of the world economy. Indeed, Moore's law has been behind the technological advancements and socio-economic developments in 21st century.

Moore's law has had an amazing run for the past several decades with unmeasured economic impact on the US semiconductor industry. The progress of Moore's law has even transformed the business model of the US semiconductor industry and continues to do so. However, now the immense problems of youth unemployment, huge capital investment, unsustainable trade and budget deficits, as well as manufacturing complexities, are contributing to a bankruptcy of economic wisdom and are making it difficult to sustain Moore's law and its economic impact on the US semiconductor industry. There is, hence, an urgent need for new ideas to constructively deal with these business and economic issues affecting the survival of the US semiconductor industry. In *Mass Capitalism*, I have provided a solution for carving out a brilliant future of the US microelectronics and semiconductor industry by transforming capitalism from monopoly

capitalism to a free-market system. The suggested solutions are resilient enough to solve the economic and business problems facing this industry.

The suggested recommendations call for a radical change in the economic thinking of semiconductor industry professionals and business leaders. These recommendations challenge the stereotyped economic views, question the sustainability of existing modes of conducting microelectronics business, introduce new ideas that promote research and development (R & D), new business models, and better economic policies for revival of the US semiconductor industry. Together, they constitute novel socio-technological and business-economic reforms towards a sustainable future of the microelectronics industry and its professionals.

In the process of exposing the reader to economic heresy, *Mass Capitalism* also introduces a new business model for the US semiconductor industry based on what is known as Progressive Utilization Theory (PROUT). But let us remember that John Maynard Keynes was also a heretic and so was the father of modern economics, Adam Smith. The economic orthodoxy is repeatedly failing the operation of the US semiconductor industry and its ability to sustain Moore's law. So let heresy get a chance for continued applicability of Moore's law and the technological-business-economic growth of the US semiconductor industry towards maintaining its global leadership.

Chapter 1 exposes the reader to the crisis of capitalism because of monopoly capitalism and introduces the reader to some common-sense reforms through mass capitalism. Chapter 2 highlights the strategic importance of the US semiconductor industry to the US economy. Chapter 3 helps the reader understand the importance of the field of microelectronics economics involved in manufacturing advanced semiconductor products and the significance of retaining a global leadership in this industry. Chapter 4 provides an in-depth analysis of the causes of the failure of the US economy based on its macroeconomic and trade policies. Chapter 5 deals with policies to mitigate the problems of counterfeit electronics, caused by the import of semiconductor systems from China by American companies based there. Chapter 6 then provides a detailed analysis of the impact of globalization on the US semiconductor industry.

Chapter 7 evaluates the US manufacturing supply chain and its impact on business models in the US semiconductor industry. Chapter 8 offers solutions towards a revival of the US microelectronics industry and introduces a new business model for vibrant growth of this industry. Chapter 9 forecasts the near future of the US semiconductor industry by taking into consideration the recent geopolitical events around the world, explains the importance of a vibrant domestic economy, and presents the geopolitical dangers of too much reliance of the domestic economy on foreign investments.

Chapter 10 offers solutions for sustaining Moore's law to overcome the physical and economic limits of shrinking transistor dimensions in order to maintain the semiconductor industry's innovation and to benefit from the business impacts of Moore's law. Chapter 11 provides socio-economic reforms for a brilliant future of the US semiconductor industry. The final Chapter 12 talks about the national financial matters that would have an impact on the sustainability of the US microelectronics and semiconductor industry. It educates readers about the importance of the circulation of currency in the US economy for achieving a higher standard of living for all industry professionals.

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About the Author

Apek Mulay is CEO of Mulay's Consultancy Services. He is a senior analyst, blogger, entrepreneur, and macroeconomist in the US semiconductor industry. He completed his MSEE at Texas Tech University, Lubbock and is sole author of the patent "Surface Imaging with Materials Identified by Colors." He has worked as a failure analyst in the advanced CMOS technology development team at Jack Kilby Labs of Texas Instruments. He is USCIS approved for US permanent residency under category of foreign nationals with their extraordinary abilities in science and technologies without pursuing PhD in engineering. He contributes to publications such as Truth-out.org, *EBN*, *Semiwiki*, *electronics.ca publications*, *EDFAS Journal*, *PROUT Globe*, and *Military & Aerospace Electronics*. His book, *Mass Capitalism: A Blueprint for Economic Revival*, is available for pre-order at http://apekmulay.com/my-book/#tab-description.