

MATS LARSSON

CIRCULAR BUSINESS MODELS

Developing a Sustainable Future



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palgrave
macmillan

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ISBN 978-3-319-71790-6 ISBN 978-3-319-71791-3 (eBook)
<https://doi.org/10.1007/978-3-319-71791-3>

Library of Congress Control Number: 2017962006

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Cover illustration: Emily Wilt/EyeEm/Getty

Printed on acid-free paper

This Palgrave Macmillan imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

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1

Mankind vs. Reality

Efforts to develop a sustainable future have only recently started. The development of solutions has relatively little to do with the analysis of emissions and other sources of pollution and much more to do with business and economics and how concepts within these areas can be creatively applied in order to develop sustainable systems. Humanity is facing a number of challenges of unprecedented magnitude and complexity. Yet, scientists and experts are at an early stage of analysing the problems and developing solutions that can help solve them. Part of the problem is that the challenges are not only large and complex, but also the solutions need to be developed in a very short space of time, in order for countries to be able to implement them before the problems become severe. Understanding the problems and identifying the possible solutions require a significant effort of abstract reasoning. Waiting until the problems become apparent is a very risky strategy. Solutions need to be developed and implementation needs to start before problems become clearly visible.

Many solutions have been and are still discussed, and there are strong proponents that advocate one or the other remedy to the situation of climate change, resource depletion, and imminent supply constraints. When these solutions are scrutinized it becomes clear that, while the

entire complex of issues is daunting in itself, some solutions may be realistic while others seem inadequate. A number of solutions that seem to be logical first steps for a transformation towards a sustainable society turn out to be downright impossible when looked at from a long-term and large-scale perspective.

The issues range from pollution, unsustainable production systems, and business practices to impending resource shortages. Many of these have been analysed in great detail in other contexts. The awareness and debate has progressed from an awareness of environmental issues to a focus on sustainability and, in particular, emissions of carbon dioxide and climate change, and more recently to a solution that is embraced by increasing numbers of both business leaders and politicians, namely to transform existing linear production and distribution systems to circular flows. This transformation is expected to take place in the coming decades. Yet, few analysts or decision makers have started to look into the organization and financing of the large-scale projects that will become necessary in order to accomplish this.

Some politicians expound the view that the cost of the transformation does not matter, because it has to be done anyway. To this it can be said that the transformation is necessary, but the investment need, cost, time frame, and availability of resources are paramount, because, in order to drive change forward at the pace that is needed, alternatives need to be preferred that can be achieved in less time and at the expense of fewer resources. The need to choose and the need to discard unrealistic alternatives may be difficult to accept, but choices, and sometimes harsh ones, need to be made in order to try to save as much as possible of the society and the cultural values that previous and the present generations have contributed to building.

The stakes are high and it is probably not an exaggeration to state that governments and the global community at large will have to fight a battle. The battle will be fought against time and resource constraints and with the need to transform as much as possible of the global economy to circular flows, so that future generations will be able to lead as happy and fulfilling lives as the present generations do. No general would go into war without a strategy and a clear picture of the enemy's resources, strengths, and weaknesses. The leaders of a campaign would also need to

know exactly which of their own resources that can be mobilized at different points in time and they would calculate the resource needs and risks of alternative tactics. In preparation for the battle, leaders would study the topology and layout of the terrain and try to find out as much as possible about the task at hand. They would, of course, determine which resources that would be necessary for a surprise attack tomorrow at dawn and weigh this alternative against waiting for more troops to arrive and instead strike in a week's time. Alternative strategies, although in very different settings, need to be considered for the transformation.

This book attempts to sort out the possible alternatives from the less realistic, or even impossible, and analyse alternative routes forward from the perspectives of time and resources. The result can form a basis for a further discussion on how to draw up the road map for the transformation journey.

The process will include problem solving on a grand scale. There will be a need to reframe problems in order to open up doors to new sets of solutions. In order to succeed, the tool chest available to practitioners needs to be expanded and the visions of leaders need to be broadened. The transformation is not primarily a political issue, where the present generations are free to choose the tools and methods that best correspond to a particular ideology or political point of view. The choice is about pragmatically selecting alternatives that are likely to work on a large scale and avoid the ones that most probably will not. In order to do this, leaders and experts need to use tools that have been developed in the realm of business and change management. Companies and entire value chains need to be transformed, new industries need to develop and expand, and consumers and procurement officers at companies and public organizations need to develop new sets of priorities.

The Science of Problem Solving

The present society is without doubt the one in history that possesses the highest level of knowledge about the largest number of aspects of nature, society, and our entire existence. Still problem solving, where knowledge from different areas needs to be put together to form the basis for

navigating the future for countries and for the global community as a whole, presents numerous risks and possible pitfalls. The solving of complex issues is fraught with peril on a number of levels, and societies through history have repeatedly experienced unexpected developments, due to fallacies of reasoning and lack of attention to critical aspects of reality. Researchers have identified a number of sources and explanations behind these often tragic events. One of the sources seems to be the in-built tendency for speed and efficiency in human thought processes, which gives rise to a number of logical fallacies, some of which have been exposed through the pioneering research of Daniel Kahneman and Amos Tversky. In “Thinking, Fast and Slow,” Daniel Kahneman argues that people tend to automatically utilize mechanisms for thought that are well suited to solving familiar problems, even when they approach issues that would demand systematic analysis. Tversky and Kahneman gave the two systems that are adapted to solving familiar and unfamiliar problems the names System 1 and System 2. Kahneman describes System 1 as a machine for jumping to conclusions:

Jumping to conclusions is efficient if the conclusions are likely to be correct and the costs of an occasional mistake acceptable, and if the jump saves much time and effort. Jumping to conclusions is risky when the situation is unfamiliar, the stakes are high, and there is not time to collect more information. These are the circumstances when intuitive errors are probable, which may be prevented by a deliberate intervention of System 2.¹

Other researchers, such as Herbert Simon in his discourse on economic man, have attributed fallacies to the human inability to deal with all aspects relevant to a decision to limited cognitive resources. In “Organization Man,” William H. Whyte attributes the inability of individuals to express their personal views to the belief that organizations are able to come to better conclusions than individuals, and Nils Brunsson, in “The Organization of Hypocrisy,” identifies the existence of two sets of standards—one that is used internally in an organization and another that is expressed to external parties—as a source of failure of entire organizations to approach sensitive issues in a constructive manner.

The book analyses the opportunity to develop and expand circular business models from the perspectives of the long-term development of society and its organizations and the struggle of humans to drive forward a complex development that no individual expert or decision maker has full control of. It seems as if the development of the present global economy, which has been going on for more than two centuries, has come to a crossroads that neither the proponents of continuous growth nor the advocates of sustainability have fully understood. It is now up to the present generations to make sense of the situation and develop the tools and solutions that will become necessary in order to solve the problems that the development up until now has created.

Notes

1. Kahneman, Daniel—"Thinking, Fast and Slow," p. 79.

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- Brunsson, N. (1989). *The Organization of Hypocrisy*. Chichester: John Wiley and Sons.
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Part I

Business and Organizational Aspects of Circular Economies

2

Development as a Process of Organization

Development, as people experience it over decades and centuries, can be described as a process of organization, as much as it can be described as a sequence of technology development. It could be a process of organization around ideas, such as democracy and freedom, or around totalitarian and restrictive ideas, such as the systems within the former Soviet Union and its satellite states. In this book we will study the development and gradual refining of the processes and institutions that form pillars of the global economy, supply chains, and companies and organizations that provide us with the goods and services people need and enjoy. It could also be the process of organization around technologies and products, the study of an entrepreneur who invents a new product, builds a company to develop and produce it, and recruits suppliers who, in their turn, recruit sub-suppliers. As the process of development goes on, researchers at universities study the technology and the systems that have been developed and teach students the knowledge and skills they need in order to work in the industries that form and expand, and public organizations act as suppliers of financing, regulators, or customers of the new innovations. With each additional individual who is added to the workforce, teams of experts, or managers, the organization around a technology grows. It is no exaggeration to state that the society of the early twenty-first

century is highly organized and that society as a whole is organized to a level unprecedented in history.

Organization processes go on, literally, for centuries. When Gottlieb Daimler built his first automobile, many of the parts and sub-systems were produced by him and a small number of suppliers closely connected to the inventor. Over time the small organization for building cars has been developed and a number of technical and organizational innovations were made that contributed to making production more efficient. At the beginning cars, and most other products, were made as unique individual specimen of a construction made by the innovator. Each part was custom made for a particular vehicle, gun, or kitchen range. This meant that all parts were unique and they tended to differ slightly from the parts of other individual products of the same model from the supplier. A door made for one car could not be exchanged for a door made for another vehicle, because they were made to measure and the measures differed slightly between product specimens.

This was gradually changed, first by the American military that developed the American production system, based on interchangeable parts.¹ In battle it was a problem when a unit had five broken rifles and they could not use the parts to build two functioning ones. It was also found to be more efficient if different production units could produce components that would then be assembled at an assembly plant, independent of parts production. For this reason the manager of the gun production facility at Harper's Ferry developed a production system by which a model of a product could be manufactured using identical parts, resulting in identical products. The first successful production run was completed in 1822. This opened up the opportunity to organize production systems in a new way, assigning parts production to a number of different companies or units, knowing that the final products would be identical regardless of who had produced them. It took time for the method to spread. In combination with the ideas on scientific management developed by Frederick W. Taylor, the American production system formed the basis for the invention of the assembly line and the development of a mass market for cars by Henry Ford and it makes up a substantial part of the explanation behind the tremendous competitive advantage enjoyed by Ford at this time. This idea of car production was then further

developed through the development of quality systems, which took standardization of products and their components one step further and the introduction in the 1990s, on a global basis, of the principles of Lean Production, Total Quality Management, and other modern management tools that are used in order to manage production.²

Together with the general development of society towards globalization and global supply chains, these steps have contributed to the organization of car production to the level that can be observed today. Nowadays, there are a number of automotive companies that develop cars, integrate the sub-systems, build brands, and market vehicles to various customer segments. Based on the principles of Lean Production, these companies have organized a first tier of system suppliers, with manufacturing plants often located close to assembly plants. First-tier suppliers are responsible for the development and production of key systems in vehicles. These first-tier suppliers, in their turn, buy components from second-tier suppliers that may be located anywhere on the planet and these companies, in their turn, purchase parts and materials from third-tier suppliers, and so on. These supply chains have proliferated over decades, making each supplier increasingly specialized, focusing on a narrow range of production steps and technologies. The steps that can be identified are all part of an organization process, by which production has become increasingly efficient as each new step has been taken. Connected to the automotive industry, there are also large numbers of highly specialized consulting companies that supply services in areas such as technology and organization development, IT, and training.³

Looking back, it is also possible to see how knowledge around production has developed. From the development project run by the American military, over the development of the principles of scientific management, to the development of mass production and Lean Production, it is possible to recognize the role of research at universities and the development of and teaching about methods at consulting companies, training companies, and schools. Later, organizations, often referred to as non-governmental organizations (NGOs), have gained importance, organizing projects for collaboration between companies, universities, and NGOs. These NGOs come in different forms and shapes and have different goals, defined by the companies and individuals that stand behind the initiatives.

The development of the automotive industry and car production is an example of a development process that has resulted in networks and clusters of highly specialized, competent, and efficient companies. Each company and organization in the network has a well-defined role and the organizations, competencies, resources, and processes inside companies have developed in the same way, proliferating in order to improve the abilities of each partner to contribute to the efficiency of the entire system.

In parallel with the development of the automotive industry, other industries and sectors of society have gone through similar processes. Each industry that has been in existence for a number of decades has developed towards a high level of complexity and it has gradually won its efficiency through that process.

Before the industrial revolution most people were farmers on largely self-sufficient farms. Each community and production unit were to a large extent independent of the surrounding world. The production that existed was done by local craftsmen, organized in guilds. Over the past centuries, society has become increasingly organized. Most individuals and companies are to a large extent dependent on global or national supply chains and the increasing specialization is ongoing. Society is in many ways similar to a closely woven fabric, where each thread contributes to the strength of the garment. The fabric of society provides strength as long as companies and other organizations can continue to weave new threads into it through the processes of incremental improvement and revolutionary innovation. Each step of improvement contributes to increased efficiency and economic growth. With a few billion individuals who are part of this well-organized whole, it becomes a challenge to re-organize society according to a new set of principles for production and distribution.

The Organization of a Circular Economy

A circular economy is an economic system where production and distribution are organized to use and re-use the same resources over and over again. The present system consists of linear flows, where resources in most cases are used once, made into products that after they have been used end up on a landfill. Some materials are recycled, but the focus is on

materials recycling and the properties and the value that products are endowed with through elaborate production processes are lost.

The development of the circular economy is likely to go through a number of steps. The process has to consist of a gradual unravelling of the linear economy and a re-organization into circular business processes. This development is not likely to be a simple and automatic matter of moving away from non-renewable materials and existing principles of product design and construction towards renewable materials and new design principles. Due to impending resource constraints and the need to move towards an increasing share of local production in combination with substantially more resource-efficient models, there will be a need to re-shape entire value chains and a large share of the corporate landscape. This will include the development of an entirely new way of organizing our economy. While proponents of the circular economy may see the process of change as a gradual and smooth transition to a new and better future, an attempt to estimate the magnitude of the transformation indicates that it is likely to be one of the greatest challenges ever taken on by mankind. No previous project has had as its aim to transform most business models and processes and develop entirely new configurations of production and distribution systems in all, or at least most, industries.

Needless to say, change should not be driven for its own sake, but through a close look at the transformation of linear supply chains and production systems people are likely to find that there is a need to change a number of important aspects that even many experts in the field of circular economy seem to still be unaware of. The development of a circular economy is likely to comprise innovations in a long range of areas and in order to drive this development forward, there is a need to better understand the toolbox and the competencies and skills that will be needed in order to drive the project forward. The tools and resources will have to include skills and methods in:

- Organization
- Business Development and New Business Models
- Supply Chain Management
- Financing
- Technology Development
- Sales and Marketing

In order to become efficient the circular supply chains of the future will have to include a large number of highly specialized companies that provide materials, products, and services that contribute to making end products and services as competitive as the ones that are produced in today's linear systems.

The circular solutions available today are precursors of the business models, organization structures, and financing solutions that will be present a number of years into the future, provided that the development continues and the pilot examples grow, proliferate, and turn the circular economy into a hotbed of innovation and creativity.

Making this happen is likely to present a challenge, because circular solutions have to compete against the streamlined flows of the global linear economy. There are enthusiasts out there who are already intent on contributing to the growth of the circular economy, but the majority of customers are usually neither idealistic nor aware of the roles they need to take. The challenge of innovation is seldom to start a development. Starting up activities tends to be both easy and relatively inexpensive. This can often be done by involving only a small number of people. The challenge, instead, is to sustain and accelerate the process so that the new systems come to grow and proliferate. Through this development all business may in a few decades depend mainly on circular business models. Put in the marketing terms of Geoffrey Moore, the author of the classic *Crossing the Chasm*, the main challenge of entrepreneurship and innovation tends to be to sell the new idea to pragmatic and demanding customers belonging to the category of the early majority. This challenge is often not recognized at early stages of a development, as companies are starting to attract customers belonging to the more idealistic categories of innovators and early adopters.⁴

A Development Over a Century

Some existing sectors have, like the automotive industry, developed over more than a hundred years. Others have shorter life spans behind them, but technologies and the industries that form around them develop along similar routes, from simple to more complex systems of organization,

from straightforward to complex business models, and from slightly less competitive to highly competitive business proposals. All industries have not followed exactly the same route and it is impossible to know exactly how the circular economy is going to develop, but it is possible to roughly foretell the route development is going to take, based on experiences from other similar developments and it is also possible to identify some of the hurdles that have to be overcome along the way.

Altogether, society has a large amount of knowledge about many of the aspects of innovation, sales and marketing, finance, and change management that are likely to become relevant in order to understand the transformation that lies ahead. There are also statistics available regarding amounts of resources that are used that ought to provide the baseline and tentative goalposts of the change project. Already today, at the very beginning, it is possible, without much effort, to identify some of the most important ramifications of the programme and to, in the way that Henry Ford did when he developed the assembly line and the system of mass production, consider if decision-makers are prepared to decide about steps similar to the ones that made his company a success. One of these steps was paying his workers a daily wage amounting to the, at the time, outrageous sum of five dollars per day, in order for them to be able, over time, to buy cars for themselves and thereby create a mass market.

What are the bold measures that need to be taken that constitute the equivalent of this and a number of other business and political decisions that have changed society and the competitive landscape in the past? To mention a few:

- Boeing risked the future of the entire company over the development of the company's first jet airliner, a very risky investment that paid off in the sense that Boeing, from being a small supplier of aircraft, for decades afterwards, became the leading manufacturer of jet airplanes.⁵
- Steve Jobs led Apple through the launch of the graphic user interface and took the company through its first decade of growth, left the company, and later came back to turn the ailing company around. By doing this he not only transformed the computer industry, changed the way music is distributed and enjoyed, and transformed the mobile phone industry by introducing the iPhone. He also created the iPad

and thereby took tablets to widespread use and was the co-founder of Pixar that introduced a new standard for animated films.⁶

- Thomas Edison took out 2332 patents and built the company General Electric, which still today is one of the world's largest companies. He invented the light bulb and the phonograph, and built the first urban power system in New York.
- Elon Musk founded the companies Space X and Tesla. At Space X Musk and his co-workers have dramatically reduced the cost of launching rockets for space flights. In one case the company reduced the cost of building an avionics system from the industry average of \$10 million to just over \$10,000.⁷ The success of Space X has once more made the United States a player in the business of building rockets and offering launch services.⁸ As one of the founders of Tesla he designed an electric car that became a highly desired status symbol across the world and the first electric car with a performance that could compete with petrol and diesel cars.

On the level of society, democracy, and politics, there are a number of remarkable developments and innovative initiatives that have changed the world:

- Johann Gutenberg developed the first printing press using movable type and laid the foundation of democracy, freedom of speech, widespread education, and the free press.
- The revolutionaries of the French Revolution rose against the royal family and nobility and turned France into a democracy.
- President Franklin D. Roosevelt persuaded Congress to enter the Second World War in order to assist America's European allies and turn the United States into the arsenal of democracy.⁹
- US Foreign Secretary George Marshall persuaded Congress to invest \$17 billion in the rebuilding of Europe after the war. The programme he started is known as the Marshall Plan, an endeavour that has contributed to the peaceful post-war development in this part of the world.¹⁰
- President John F. Kennedy challenged the American nation to send a man to the moon and bring him safely back to earth and established

that this should be accomplished before the end of the 1960s. He thereby initiated a wave of financing that led to technology development and the development of large-scale resources for research and development of space-related technology that people all over the world are still enjoying the fruits of to the present day.

There is no way to foresee the exact path of development of the circular economy, but it is necessary to understand that the sequence of mundane innovations that make up the everyday development activities in society has to be interlaced by a number of bold and unexpected strokes of genius. Such events are unforeseeable, but they can be anticipated. In the absence of such events, the development many people expect to unfold will be unlikely to do so. While the critical developments may be unforeseeable, the frequency and probability of such events on a bigger or smaller scale can be influenced. The more money and resources that are invested in the transformation, the more people are likely to turn their attention towards the critical issues. The more accurately the challenges are posed and the more knowledge and realism that are applied in the debate, the higher the likelihood that the solutions that are developed will be aimed at the critical areas and solve the most important problems.

Coming back to the issue of organization. In all great transformations and bold endeavours, one of the critical elements has been organization and leadership. Technology innovations have played important roles and so have innovations in other areas, but it must not be forgotten that in order to make great achievements possible, leaders need to develop strategies and build organizations that will be able to accomplish them. Over time the fledgling organizations that have been created have contributed to the development of highly efficient and competitive business systems, and thriving societies.

Notes

1. Ruttan, Vernon W. "Is War Necessary for Economic Growth?" pp. 21–25.
2. There is a substantial literature describing different aspects of these systems. Two of the early books are *Quality is Free* by Philip B. Crosby

- (1979) which introduced the concept of quality management to a wider audience and *The Machine that Changed the World* by Womack, Jones, and Roos (1990) that ushered in the development of Lean Production.
3. One of the first studies to identify “clusters” that exist in and around industries was reported in *The Competitive Advantage of Nations* by Michael E. Porter.
 4. Moore, G.—“Crossing the Chasm” pp. 11–15 (1991).
 5. Collins, Jim & Porras, Jerry I.—Built to Last, pp. 91–93.
 6. Isaacson, Walter—Steve Jobs, pp. 565–566.
 7. Vance, Ashlee—Elon Musk (2015), pp. 236–237.
 8. Vance, Ashlee—Elon Musk (2015), pp. 235–238.
 9. Gordon, John Steele—An Empire of Wealth (2005), pp. 353–359.
 10. Behrman, Greg—The Most Noble Adventure (2007), p. 165.

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3

The Author's Journey

It may be appropriate for the author at this point to introduce himself and explain how he gathered the theoretical knowledge and the experience that form the foundations of this book. A course in organization theory, taken as an undergraduate student, ignited his interest in the field. After a few years of working, he took up doctoral studies and considered focusing either on organization theory or on marketing. Instead of finishing his doctoral studies, he started in 1990 to work as a management consultant at a Scandinavia-based international consulting company that worked for a wide selection of Swedish and Finnish international companies. As a consultant, he continued to read extensively on organization theory and business strategy and had the opportunity to apply many of the theories at work. The company used to be called the Scandinavian Institutes of Administrative Research (SIAR), and the founder and the early employees, all of them PhDs, some of whom later became professors in organization theory or business strategy, took part in the early development of organization in the 1970s. Through its founder, Professor Eric Rhenman, who spent a few years as a visiting professor at Harvard, and a number of his doctoral students, SIAR became a force in the development of organization theory, hosting guest researchers who later became some of the leaders in the field in the United

States and internationally.¹ Although the institute in 1990 had become entirely focused on consulting, the methodology was still based on the scientific methods and concepts of the founders. The experience lasted for five years, working with organization and strategy development, and the experience and interest in these fields have remained through almost thirty years of consulting.

By the mid-1990s, he realized that information technology would become increasingly important to business development and started to work as a management consultant with Cap Gemini. This provided experience in IT and change management. By the end of 1996 a new colleague joined, David Lundberg, with experience from Ericsson, and other companies in the telecom industry. The two consultants came to discuss how the growth of the Internet over the coming decades would change aspects of markets and how the electronic business would transform the way that companies did business. These discussions led to the book *The Transparent Market*, published in 1998, one of the early books on e-business strategy.

A few years later the author started to work as a consultant at the NGO IUC Syd.² This company runs projects based on EU funding or funding from national government organizations of projects for business development and innovation. At IUC Syd, consultants work closely together with a large number of small- and medium-sized companies and help them take steps towards expansion. This has provided the opportunity to work with several hundred different companies in a wide range of industries, a learning experience unmatched by any previous employment.

In 2004, after having submitted the manuscript for the book *The Limits of Business Development and Economic Growth* to the publisher, he stumbled over books about the impending peak in oil production. According to the authors, the decline following the peak may spell the end of economic growth, as we know it.

The analysis that formed the foundation of the warnings seemed sound. In all probability, oil production would start to decline earlier than experts had previously expected. He took the opportunity to meet with Richard Heinberg, author of *The Party's Over*, in Santa Rosa, California, and he also interviewed Kjell Aleklett, the Uppsala professor

who, together with retired oil geologist Colin Campbell, developed the concept of Peak Oil, and a number of high level executives in the automotive industry and other industries related to oil and transportation.

While agreeing with the conclusion that Peak Oil will present a tremendous challenge, he did not believe that it would be completely impossible to transform the global economy to renewable fuels. Instead he found financing of projects from the regional authority, Region Skåne. In the first of these projects, he came, in 2005, to interview representatives of the management team at AB Volvo, the global leader in the market for heavy trucks. The managers emphasized the need for leadership in order to transform the transportation sector on a large scale and he started to analyse what would be the nature of this leadership. This work resulted in the books *Global Energy Transformation*, published in 2009, and *The Business of Global Energy Transformation*, published in 2012.

In the years following the publication of the books, he had the opportunity to work with a number of projects in the field of renewable transport systems, waste management, innovation, and new materials. In 2016, through a project financed by the regional authority Region Skåne, he turned his interest towards the circular economy, a development that led to the writing of the present book.

Earlier Thoughts on Sustainability, Circular Economy, and Transformation

Sustainability

The risks of future resource constraints have been highlighted in various ways and described by a number of different researchers and experts for a long time. Already by the end of the eighteenth century, Robert Malthus debated the risk of food shortages that would be caused by a growing population. Similar thoughts were put forward in 1972, by the Club of Rome, in the often-cited report *Limits to Growth*.

In her book *Silent Spring*, published in 1962, Rachel Carson started an environmental debate around the use of pesticides. This book is by many seen as the starting point of the environmental movement. Environmental