Felix Wortmann · Heiko Gebauer
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UNDERSTANDING PRODUCTS AS SERVICES

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How the Internet and AI are Transforming Product Companies

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Understanding Products as Services: How the Internet and AI are Transforming Product Companies

With 66 Actionable Product–Service Patterns

BY

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Prof. Dr. **Elgar Fleisch** is Professor of Information and Technology Management at ETH Zurich and the University of St. Gallen. A native Austrian, he is the initiator of several research programs at the intersection of computer science and management. He is also a co-founder and adviser to numerous start-ups and sits on a number of supervisory boards.

Foreword

Just a few years ago, all software was delivered on physical CDs. Today, it is available as a wireless service from the cloud. Just a few years ago, we bought music recorded on CDs. Today, we subscribe to Spotify's or Apple's music streaming services. Service has become an economic imperative. This imperative applies to everything that can be digitalized and is now disrupting physical products. Why? Because the digital component of our physical products is constantly expanding. It is becoming part of the core value proposition. Today, a car's software shapes the driving experience. New assistance systems and ever-larger screens in vehicle cockpits are vivid evidence of this development. And now this software is becoming a service. Today, that might only mean keeping the navigation system up-to-date. At some point, however, cars themselves will transform into a service: the self-driving taxi. In the meantime, we will see a huge variety of sharing and rental models on the market.

This book is intended to help product companies evolve from being the sole providers of products to offering customer solutions comprised of hardware, software, and services. With Product as a Service (PaaS), we explicitly do not want to contribute to the next hype and promote the ultimate solution to any kind of business model challenge. Digitalization and servitization do not affect all products in the same way, and PaaS will look different in different contexts. Nor do we argue that the relevance of either physical products or the manufacturing industry is declining. Quite the opposite: we assume that the world will remain largely physical and that manufacturing will remain pivotal. Physical products will continue to generate the lion's share of sales and employment in the manufacturing industry. However, competitiveness is increasingly determined by solutions that are based on hardware, software, and services. For many manufacturing companies, software and services are becoming strategic necessities rather than optional opportunities.

The book is the result of a long-standing collaboration between industry and research at the Bosch IoT Lab at ETH Zurich and the University of St. Gallen. The three partners – Bosch, ETH Zurich, and the University of St. Gallen – founded this lab to better understand how the Internet of Things is changing the manufacturing industry. It quickly became clear that the seamless connection of the digital and physical worlds was creating promising new value propositions. Physical products could now be combined with software and digital services to provide comprehensive solutions to pressing customer needs.

Europe, the world champion of production, had remained too dormant throughout the first major wave of digitalization, led by Amazon, Google, Meta, and Microsoft & Co. US companies were more experimental, more pragmatic, and much faster than their European counterparts. The same was true for companies in some Asian countries, especially China. While Europe may have the best data protection law in the world, it has virtually no digital business. We import almost all digital services from across the Atlantic.

Now the race is moving into a second phase: the digitalization of the physical world. The opportunities for Europe are enormous. Arguably, it is easier to move from hardware to software than vice versa. This, however, requires acknowledging that these two worlds follow different business models and development paradigms and act accordingly. That this is far from easy can be observed in the automotive industry. Here, the first battle was won by Tesla and BYD & Co. But the race has only just begun.

This book explores how the digitalization of products shapes the future business models of product manufacturers. It has three main parts, which can be read separately. Part I – How the Internet and AI are Transforming Product Companies – reflects on the interplay of hardware, software, and services. It is written in the first person and is easily digestible. Elgar Fleisch, the eldest of the authors, describes his fundamental findings and insights along his personal learning path. Part II – The Product as a Service (PaaS) Navigator – introduces a management tool that aims to support the transition toward PaaS. It is written in a more formal style and shows step-by-step how companies can expand their product and service business thanks to digitalization. Part III – The 66 PaaS Patterns – is intended to provide quick reference and inspiration during innovation work.

This book is aimed at practitioners. Excerpts have already been published in scientific publications such as dissertations, journals, conferences, and working papers. To enhance readability, we have omitted long lists of literature and theoretical underpinnings. Only the most important sources are listed at the end of the book. Our research publications are also available on the Bosch IoT Lab homepage (www.iot-lab.ch). Whenever possible, we demonstrate central ideas through concrete practical examples. Many of these examples are cutting-edge. They are in competition and constantly developing. Moreover, they become part of larger initiatives and, in some cases, even disappear. However, their underlying ideas and patterns, which we describe in this book, remain stable over time.

The developments described here also drive the circular economy. Manufacturing companies offering PaaS have a great incentive to optimize their economic and ecological footprint across the entire product life cycle. Product business, digitalization, and sustainability go hand in hand, thus creating another significant opportunity for the European industry.

This book is the result of a significant team effort. We would like to thank everyone who supported us in our research and publishing activities: Johanna Knapp, Dominik Bilgeri, Elisabeth Vetsch-Keller, Malte Belau, and last but not least, Sheena Reghunath and Nick Wallwork at Emerald Publishing. We would also like to thank our industrial partners for their time and trust.

And we wish you, dear reader, an enjoyable reading experience and every success in implementing PaaS yourself.

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