

Preface

By Prof. Rolf Steinhilper

Three areas: 1. Service Engineering (a new scientific discipline discovered only recently), 2. Automotive Maintenance (a task undergoing radical changes because of the introduction of electronics and mechatronics into cars) and 3. Remanufacturing Technologies (also challenged by cars' electronics and mechatronics) form the background of this very interesting new book edited and composed by Fernand Weiland. After outlining the key challenges, it presents new technologies and opportunities mainly in the field of remanufacturing automotive electronics, profiting from the pioneering spirit and the expertise of a handful of innovative personalities around the globe who are willing to share their knowledge with those who are also taking part in this exciting journey.

So it is a real pleasure and honor for me to give some introductory remarks in a preface to this book, which I hope to be the ignition for inspiring a sequence of more good news and valuable information for the rapidly developing remanufacturing technology of automotive electronics and mechatronics.

1. SERVICE ENGINEERING – A NEW SCIENTIFIC DISCIPLINE

The term 'Service Engineering' has now been around for a little more than ten years, describing a challenging and fascinating field of work besides the engineer's classic disciplines such as design engineering, manufacturing engineering or industrial engineering.

Being a huge new field, Service Engineering is defined in the academic world as the 'systematic development and design of services using appropriate models, methods and (software) tools'.

Given this definition, Service Engineering is positioned in-between engineering and economic sciences. Thus it is driven by both the transition from production-based to service-oriented



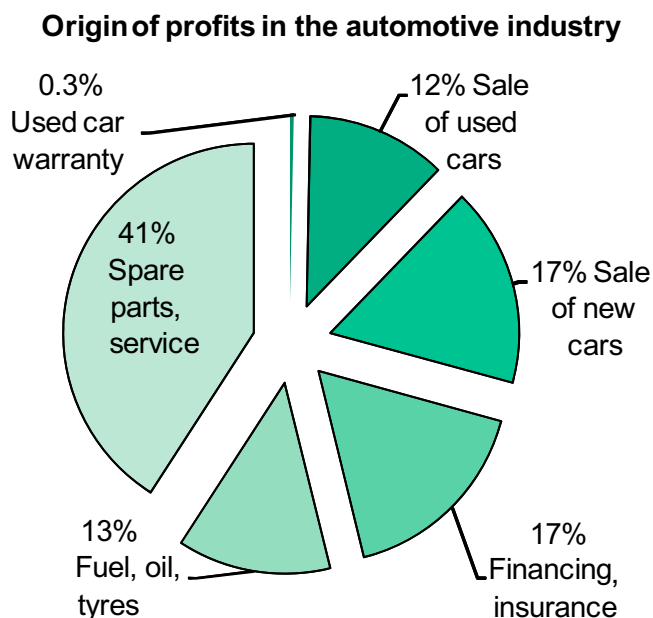
economies as well as by the possibilities of new information and communication technologies such as B-to-B and B-to-C activities via the internet.

Service Engineering – and in particular Technical Service Engineering for cars – aims at developing processes for maintaining a car's performance (and thus also its energy consumption and emissions) on the levels it was designed for, as well as providing know-how and spare parts to fix failures (and thus reach or even extend the product's desired lifetime) – it is therefore of real significant economic and ecologic relevance within the total life cycle of a car.

So far, however, scientific research & development efforts towards innovative Technical Service Engineering is still a widely 'unexplored territory' – but the potentials are both huge and promising.

2. AUTOMOTIVE AFTERMARKET SERVICES – BUSINESS OF WORLD SCALE AND SCOPE

The so-called 'automotive aftermarket' – the business of car repairs and spare part supplies – is of wide scope: both in volume and in secrecy (!). Regarding sales, the global automotive aftermarket business is worth 600 billion Euros (850 billion US \$) which means only around one third of the size of the global automotive business. But as figure 1 shows, that regarding profits, the automotive aftermarket contributes three times as much than new car sales to the profits of the automotive business!



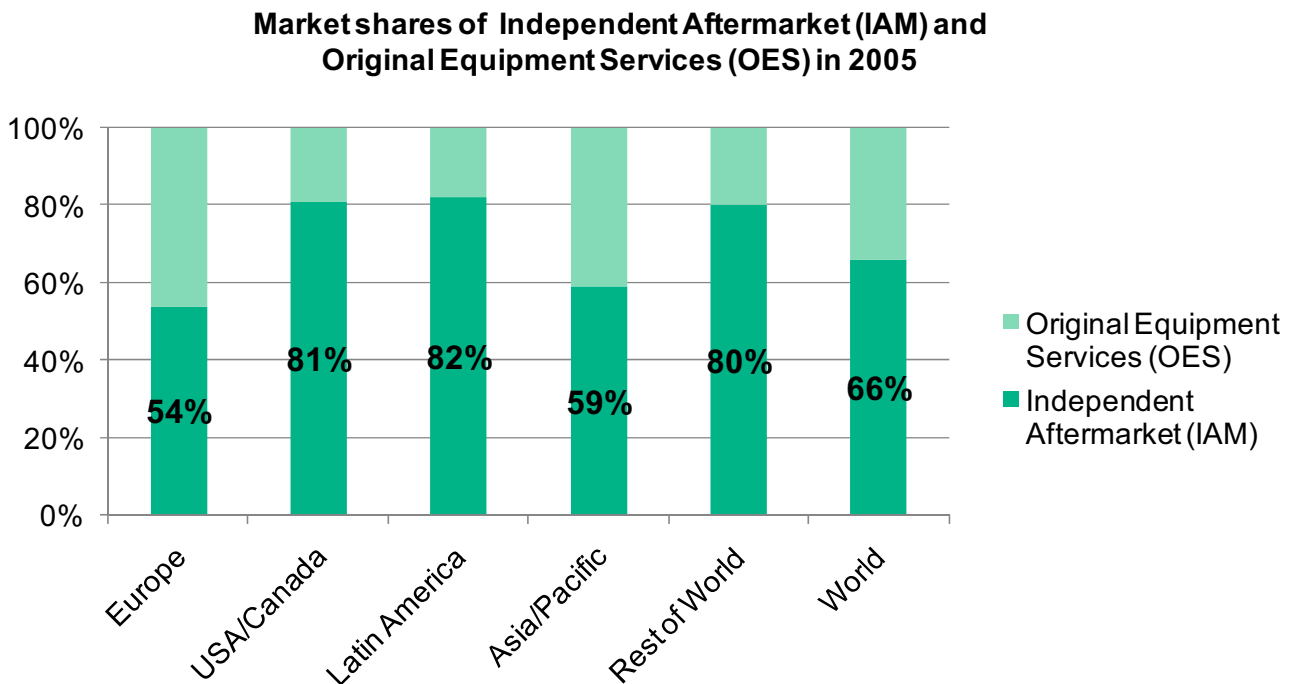
- **Global aftermarket worth over EUR 600 billion** (= USD 888 bn = JPY 94,653 bn = CNY 6,315 bn)
- Aftermarket equals 1/3 of the global automotive industry turnover of EUR 1,889 billion
- Continued growth over the coming years
- Aftermarket makes up more than 50% of profits

Source:

Booz Allen Hamilton from Autom obilwoche no.12 (2005) and OICA (2007)

Figure 1: Automotive Service – How big is it?

The majority of the automotive service and spare parts business, to some extent depending on the geographical region it is operating in, is done by the so called 'IAM' (Independent Aftermarket), not primarily by the 'OEM/OES' (Original Equipment Manufacturer/Supplier), see figure 2.



Source: GEP (2005)

Figure 2: Independent Aftermarket (IAM) vs. Original Equipment Services (OES).

This competition between OEM/OES and IAM is tough, but it is of course good news for both technological progress and service innovations for the customers/car owners.

3. TECHNOLOGICAL TURNAROUNDS OF AUTOMOTIVE MAINTENANCE AND REMANUFACTURING TECHNOLOGIES

The rapid introduction of computer controls, which operate engine and power train management, assist driving, steering, braking, suspension and many other safety, transmission and/or comfort functions in today's vehicles, is challenging both service operations and skills along the car's life cycle as well as remanufacturing technologies and

the involved failure diagnosis requirements. Figure 3 depicts the radical shift (or technological turnaround) of automotive maintenance operations.

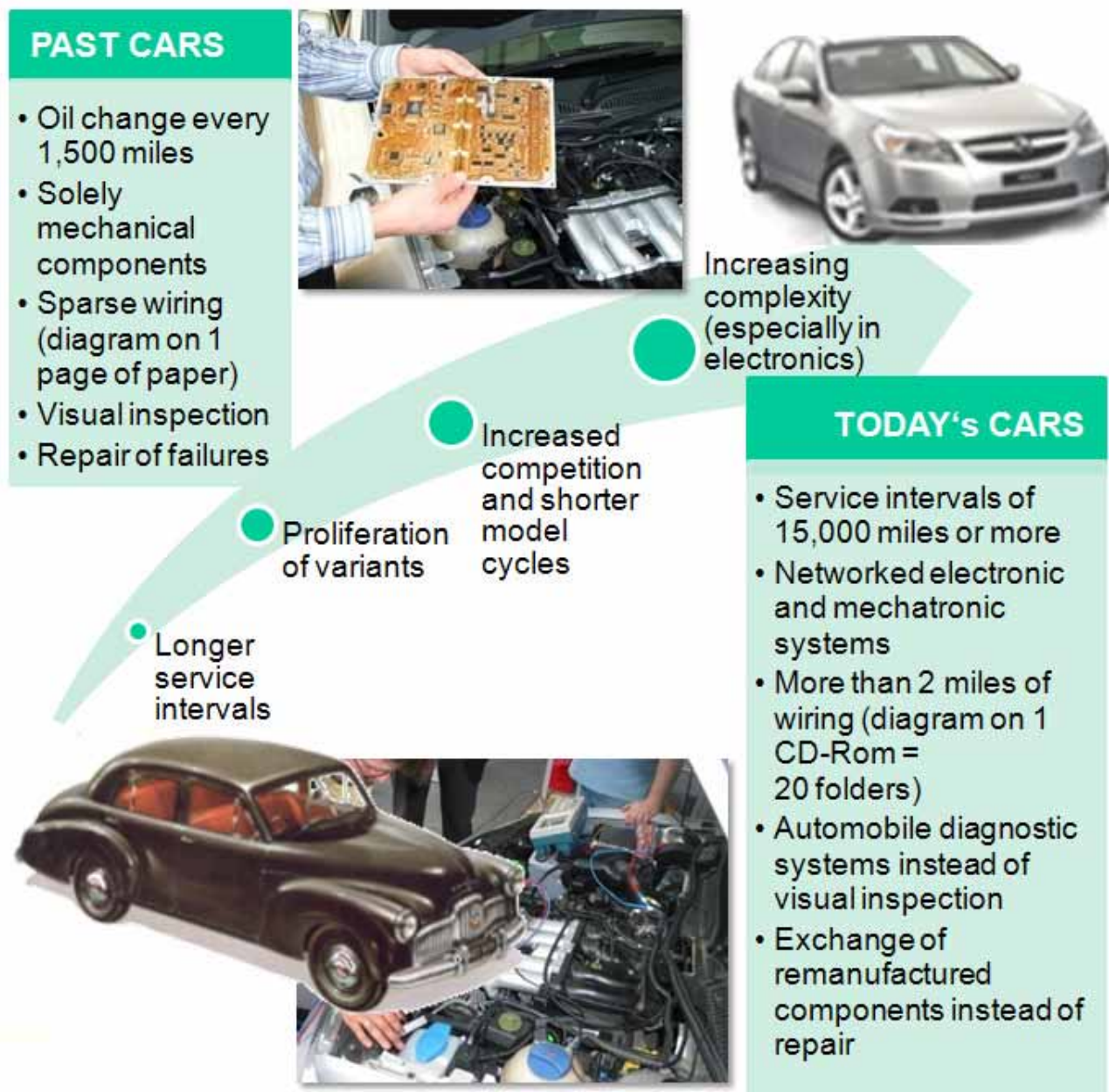


Figure 3: Automotive Service Engineering – New Technologies and Opportunities.

Many, if not most of these changes in automotive maintenance are caused by the introduction of microcontrollers, electronic and mechatronic components for more and more car functions.

The remanufacturing technologies for such electronic and mechatronic components in today's and tomorrow's cars also need to be improved and will see some significant changes and extensions in the near future. These developments are the focus of all following chapters of this book – so no details will be pointed out in this preface.

It should be stated, however, that many recent Research and Development projects which are run together with OEMs/OESs and the IAM at the Chair Manufacturing and Remanufacturing Technology at the University of Bayreuth, Germany, where Prof. Dr.-Ing. Rolf Steinhilper and his team of 10 engineers also operate a European Remanufacturing Technology Center, deal with the development of new remanufacturing technologies and business opportunities for automotive electronics and mechatronics. The contents and results of all these projects are clearly showing that in the intersection between up-to-date know-how from the three areas Service Engineering, Automotive Maintenance and Remanufacturing Technologies, many new opportunities arise, see figure 4.



Figure 4: Automotive Maintenance Operations.

4. ENJOY READING!

Already today most world class companies have remanufacturing operations to boost their own productivity and competitiveness in the service sector. But remanufacturing is also a business for the small, family-owned, local companies, which are the backbone of every national economy. Small innovative remanufacturers often tie the most intelligent knots in the global players' networks.

Remanufacturing is an eco-innovation driver, with potentials on the economic and the environmental sides as well. It will conquer new disciplines and new product areas like the car electronics and mechatronics and open new markets.

We must also remember that the strongest driving force in our market place is always the consumer – 'technological push' needs 'market pull'. Remanufacturing technology matters, but not as much as the people who will buy the remanufactured components and ultimately benefit. Fortunately, consumer research also indicates a rising awareness which is more than just lip service towards protecting the planet; particularly if customers can have some fun and save money at the same time. Remanufacturing offers this magic twin opportunity.

So I am very grateful to my friend Fernand Weiland for publishing this book – but not only my thanks go to him but all the other authors for undertaking this effort.

My best wishes mainly go to the readers of this book for their interest in the further advancement of the great concept of remanufacturing. There is a strong potential for growth – the kind of healthy, balanced growth we need.

Remanufacturers are in business at the right time in the history of the world to provide answers to many of our economic, environmental and employment challenges. Enjoy reading, grasp the opportunities in the areas of vehicle electronics and mechatronics and take action!