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World Robotics

Service Robots

2023

Statistics, Market Analysis and Case Studies

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World Robotics 2023 – Service Robots

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Foreword

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Dear Reader,

In fact, since 2019, we are now writing the first preface that does not need to totally focus on the impact and circumstances caused by the pandemic. Quite the contrary - perhaps you are currently experiencing a similar situation to ours and the variety of events, networking opportunities, and undertakings, which involve travel, too, is indeed remarkable.

Yet, there are enough challenges facing us all that are also affecting the global service robotics market. To name just one: The labor shortage has come to stay in many fields, e.g., in restaurants, at airports, or in the crafts. While in the past, many facilities were closed due to the pandemic, we are now experiencing closures or limited opening times caused by the shortage of staff. Service robots have the potential to provide support and relief here and we see more and more solutions like smart transport robots bringing dishes to the guests or a startup offering a painting robot.

In general, the situation we all had to deal with during the last years strongly supported the acceptance of technology and digitalization. This sometimes created a hype for new robotic solutions and now we see some consolidation of this phase. An example is the development and growing market for cleaning and disinfection robots. Another trend can be observed in the area of legged robots or humanoids. A new development takes place in agriculture. Ambitious political and social goals in the context of sustainability, such as the EU Green Deal, require further technological developments, such as agricultural robots. Long story short: The service robotics market is still growing and opening up completely new opportunities for many companies. Some high investments made themselves heard, but also the one and other company closing its doors.

Many details about the market and technologies are described in the book at hand. The 2023 edition of “World Robotics Service Robots” presents numbers and market data from the previous year. As was the case in prior years, large growth markets are contrasted by small, highly specialized niche markets, with many startups joining the fray and other companies unable to establish themselves on the market. For the first time, we integrated several interviews with robot manufacturers from all over the world. This year, we focused on the applications cultivation (AP 11), professional floor cleaning (AP 22), and

mobile robots in environments with public traffic, e.g., hospitals or restaurants (AP 52). The interviews give insights into company strategies, market opportunities and hurdles that should be overcome to widen the usage of service robots in the mentioned applications. Some interesting findings from the interviews with experts were, that service robotics as such has matured significantly in the recent years. Many technological challenges are no longer seen as obstacles to the implementation of robots, but rather aspects of integration, acceptance and regulation, which must keep pace with the rapid technological development. However, for indoor applications such as cleaning and delivery robots, sometimes the missing digitalization of the environments reduces the effective use of robotics. Furthermore, finding the right way to integrate the robots into the existing processes is still a challenge. In some environments, the staff is not used to technology and has to be convinced with easy-to-use interfaces and a clear value of the robots that it is worth using them.

In close cooperation, Fraunhofer IPA and IFR are observing nearly than 1,000 companies worldwide offering service robotics solutions (amongst them are about 9% startups). Both, the professional and the consumer service robotics domain benefit from recent technical innovations: Fundamental developments in the fields of digitization, cloud technologies, 5G and artificial intelligence, specifically in machine learning, are leading to a technology push in service robotics. For the mentioned AI technology, there is a brand new player on the market: Generative Pre-trained Transformers like ChatGPT will turn service robotics inside out, for example in terms of intuitive operation or support for creating program code. It remains to be seen how this influence will be experienced in concrete terms.

The free Robot Operating System ROS continues to be extremely popular and enables a quick start to the development of service robot applications even with few own resources. In this field, also the “Open Robotics Middleware Framework” (Open-RMF) should be mentioned. It offers new chances for a better interoperability between robots (e.g., fleets of different mobile robots) and physical infrastructure. New virtual market places enable ease of deployment and use, more standardization, and thus not less than the “democratization of robotics”, as could be observed on important trade fairs like Hannover Messe, Automate in Detroit or automatica in Munich.

On the other side, we see a strong market pull, specifically for professional service robots. New business models at the same time significantly lower the financial barriers to decide for the use of a service robot in volatile markets. A prominent example is “Robot-as-a-service” which means that the user only pays for the tasks the service robot fulfilled successfully.

“World Robotics Service Robots” has established itself as the widely acknowledged reference publication in statistics, forecasts, market analysis, and profitability of robot investments. Robot suppliers, media, government bodies, financial analysts, and technology scouts are among its readers. It specifically provides profiles of the numerous service robot manufacturers worldwide. The many hyperlinks pointing to online

resources invite you to further investigate your topic of interest by looking into selected publications and company websites.

Finally, we are indebted to our colleagues at Fraunhofer IPA, particularly our group members and authors of the chapters: Winfried Baum, Simon Baumgarten, Nikhil Srinath Betgov, Florenz Graf, Theo Jacobs, Florian Jordan, Max Kirchhoff, Dominik Moss, Cagatay Odabasi, Agha Ali Haider Qizilbash, Tobias Rainer Schaefle, and Miriam Schmelzer for their valuable editorial work. Furthermore, we highly appreciate the support of Dr. Karin Roehricht and her students, Antonia Bernecker, Smilla Dalek, and Hannah Kontos, in preparing the report.

In case you have any suggestions or further inquiries related to service robotics, please do not hesitate to contact us!

Best wishes,

Dr. Werner Kraus, Dr. Birgit Graf, Kevin Bregler