

RESEARCH REPORT

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EXECUTIVE SUMMARY

Wearable Devices for Enterprise and Industrial Markets

Corporate Wellness, Manufacturing, Warehouse, Field Maintenance, Mobile Workforce Management, First Person Communications, Holographic Modeling, Workplace Authentication, and Other Applications

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SECTION 1

EXECUTIVE SUMMARY

1.1 INTRODUCTION

Wearable devices like fitness trackers have started to impact consumers' personal lives, making them more knowledgeable about their activity levels, sleep patterns, and eating habits. However, the impact of wearables goes beyond trackers and personal life into work life, as well, giving companies and employees the tools and technologies to transform the workplace to be more productive, safe, and collaborative. The adoption of wearables in the workplace will occur both in corporate enterprise environments and in industrial settings such as warehouses, manufacturing shop floors, and field maintenance sites. For the purposes of this report, Tractica separates enterprise and industrial use cases, as they bring different opportunities, challenges, and use cases.

Enterprise wearables, as defined in this report, mostly refer to wearables that are used in a corporate setting. This includes wearables that are part of the bring your own device (BYOD) or bring your own wearable (BYOW) trends, as well as those that are part of corporate wellness programs that incentivize the employee to use a fitness tracker or smart watch to track health and fitness as a part of an employer's benefits offering.

Industrial wearables defined in this report are used in manufacturing or other industrial environments including oil and gas, mining, aerospace, warehouse, engineering services, transport/logistics, field maintenance, and mobile workforce management, among others. Industrial wearables are typically customized for a particular task or workflow and generally provided by the employer.

This Tractica report covers the market for enterprise and industrial wearables, providing comprehensive coverage of the various wearable device types, their specific roles, and adoption timelines in the workplace. The devices covered include smart watches, smart glasses, fitness trackers, smart clothing, body sensors, wearable cameras, and other wearables. The report also includes market sizing and forecasts from 2013 through 2020, providing shipments and revenues, while segmenting the market by device type, region, enterprise, and industrial use cases.

1.2 MARKET DRIVERS

The market for enterprise and industrial wearables has a number of drivers that will fuel adoption and growth. These drivers are outlined below.

The ability to quantify employee wellness and overall health of a company through wearables is a powerful factor that should find increasing adoption in the workplace. This is part of a larger trend of people analytics within companies where big data and machine learning is being used to enhance human resource functions, such as hiring and retention, sales, and employee satisfaction.

Smartphones can be a distraction at work, with users having a tendency to check notifications multiple times during the day. The smart watch provides an opportunity to reduce the number of times you unlock and open your phone, as notifications are filtered to your wrist. The glanceable user interface (UI) of a watch is likely to be more effective at preventing distraction compared to the action of staring at a large smartphone screen that presents multiple opportunities to stray from the task at hand.

Hands-free capability is a highly valuable resource in the workplace, especially in industrial settings. Wearables solve that basic need by allowing workers to continue using their hands for other activities, while providing them with the necessary information, or the ability to communicate. This is one of the main reasons why devices like smart glasses and others continue to see adoption in the industrial workplace.

Wearables can also help improve industrial workflows, impacting the cost and delivery of the product or service. Workflow efficiency is highly dependent on workers being able to multi-task their way around the shop floor, as they manage different input, capture, and guidance mechanisms. Wearables like smart glasses and wearable cameras can roll all of those separate mechanisms into one device. Smart glasses are input devices that can hold manuals and diagrams, while also capturing video and photo at the same time. In addition, smart glasses and wearable cameras provide a unique first-person view. For the first time, workers on the shop floor or in the field can provide their colleagues and managers a first-person view of what they are seeing. This can help in specific situations when they need help or assistance, or when they need to give instructions or provide training.

1.3

MARKET BARRIERS

A number of drivers exist for enterprise and industrial wearables. However, a few barriers could slow growth and adoption.

Policies around data security and privacy in the workplace have a big impact on how employees use wearables in the workplace, especially health and fitness tracking wearables that are part of a corporate wellness program. While employers could have noble intentions, it is important that employees check their individual state laws and local laws, which can vary, also looking into finer details, such as how the data will be used once they leave the company and if the data is transferable. It is also important to understand how well the data is secured and encrypted to prevent the data falling into the hands of hackers.

The invisibility of wearables is critical in certain customer-facing applications within the enterprise. In use cases like retail, hotels, and transportation, the risk exists that customers are put off by the sight of Google Glass or any other smart glasses device that looks different from a normal pair of glasses. Unless the wearable becomes invisible to the customer, there are risks that the customer will mistake it for a recording device or facial recognition device, perceiving it as a threat to their privacy.

In some extreme cases, we have seen employers like the insurance provider USAA put a blanket ban on wearables in the workplace, citing reasons related to inadvertent recording of audio and images, safety hazards, and infringement on employee privacy. While some of this is a knee jerk reaction to Google Glass, educating employers about the positive benefits of wearables is an uphill battle, especially concerning improving workflow, allowing for a more productive worker, or the use of wearables in corporate wellness. Nevertheless, there will be companies that apply prohibitive policies or might even ban wearables in the near term, which could impact the growth of enterprise and industrial wearables.

In certain areas like oil and gas, safety becomes the primary concern, especially when it comes to using electronic equipment in a hazardous chemical environment like an oil rig. There are specific standards that any electronic equipment, such as wearables, will need to meet, along with training the personnel who operate the equipment. Therefore, the adoption of wearables in hazardous environments is likely to take longer.

1.4 KEY APPLICATION AREAS

Tractica sees enterprise and industrial wearables being used today and in the coming years in the following key application areas:

- **Fitness Bands/Smart Watches for Corporate Wellness Programs:** Tractica sees a large percentage of corporate wellness programs that use wearables to encourage a healthy lifestyle among employees, moving from fitness trackers to smart watches. Smart watches can be used by employees to track their own heart rate, activity, and other vitals, as well as a useful companion device to the smartphone, which is most likely something that the employee will use in any case, even as smart watches become more ubiquitous.
- **Warehouse/Logistics Applications:** Wearables will be used for simple barcode scanning or overlaying information about products, such as where to stack or which items to pick up. DHL and Ricoh have already showcased how they are using smart glasses in the warehouse, providing specific efficiency gains. DHL says that, in the pilot it ran for 3 weeks, it saw a 25% performance increase in order picking, which removed the need for any handhelds or paper lists.
- **Manufacturing Shop Floor Inspection:** BMW in the United States has been using smart glasses for inspection checking and quality assurance for its cars. The pilot that the company ran allowed inspectors to take photos and video to document potential deviations in production quality. This was done to show workflow improvement, allowing BMW to get rid of paper-based quality assurance checks, providing a hands-free environment for the inspector, making the checks efficient, and providing more contextual information related to the checks.
- **Workflow Improvement:** Boeing is using wearables to reduce paper-based instructions for assembling wire harnesses. Traditionally, this task was done using a paper-based manual and diagram that workers would need to reference while trying to assemble a complicated wiring harness. The earlier method is prone to errors with the worker's hands caught between the harness, the manual, and the diagrams.
- **3D/Computer-aided Design (CAD) Modeling for Engineering or Architectural Firms:** HoloLens and other augmented reality (AR) smart glasses have been shown to be ideal devices for designing products or buildings. Where traditional CAD software has been used on 2D screens to perform the task, smart glasses would allow users to see their design or object as a 3D hologram, providing opportunities to peer around different angles and corners, even inside the object, and treat it like a real object in front of you, rather than a mock-up on a screen.
- **Authentication in the Workplace:** The Nymi Band, smart watches, or biometric-equipped fitness bands are likely to be used as authentication devices in place of security cards, as two-factor token IDs. Wearable devices provide a unique 2-in-1 feature having both the biometric capabilities to verify the user and the display for any authentication codes that might be used.
- **Mobile Workforce Management:** Smart glasses, smart watches, or possibly smart wrist-worn tablets could be used for mobile workforce applications. Field force automation typically uses large, clunky, and heavy handhelds to scan barcodes, enter signatures, or enter any other data point in the field. All of these features can be automated and the workflow made more efficient with a hands-free wearable device.

1.5 STRATEGIC RECOMMENDATIONS FOR THE VALUE CHAIN

The larger market opportunity for wearables is in the consumer segment, or sports and wellness segment. However, the enterprise and industrial segment has ample room for companies to innovate and solve key business problems.

An entire industry is taking shape, providing wearable platforms and integration services that help companies work through some of the key challenges as the hardware and software mature. The sooner that companies can gain a foothold in this space, the better, giving them the needed experience and track record that is so critical in the early stages of any new industry.

While it makes sense for companies in this space to specialize in certain device types like smart glasses, it is important to keep one's net open just enough, especially around cross-integration of different wearables and how that could enable unique interactions within the workplace. The future points toward a complex mix of wearable devices within the workplace; therefore, having them work and interact with each other and with other machines, sensors, and robots within the workplace will become critical.

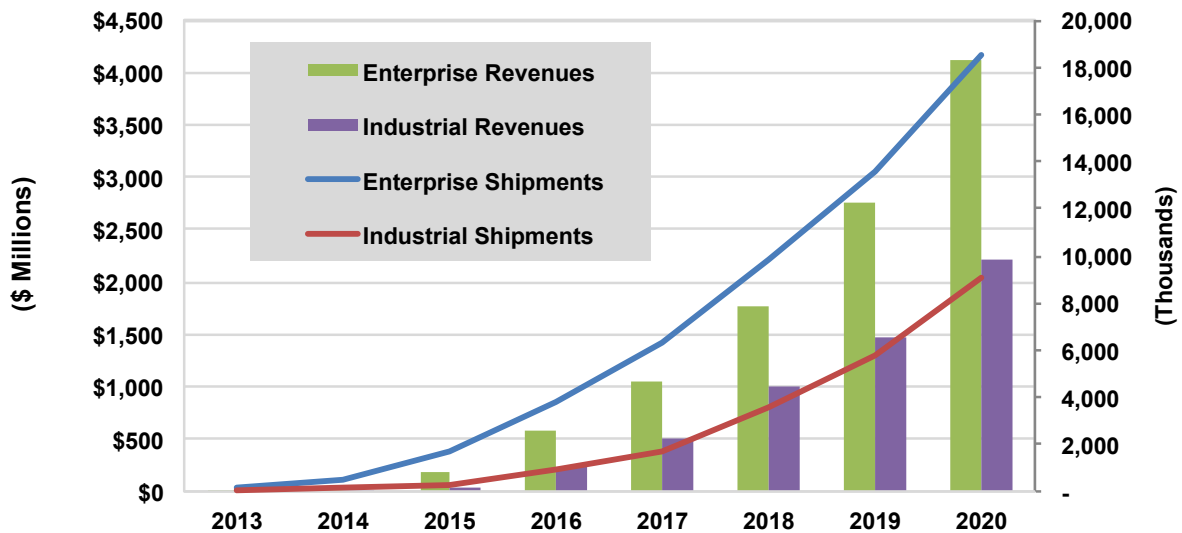
There is also room for newer wearable devices, especially wrist-worn wearables beyond the smart watch. With curved displays being introduced into smartphones, there is an opportunity for curved screens on armbands acting like a wearable tablet computer for specific mobile field workforce applications. Within the software space, as AR and holographic capabilities make their way into smart glasses, there is a larger opportunity for enterprise apps around office communication, data, and image search, as well as data visualization to become much more engaging and effective. Companies that are able to innovate around a creating new UI/user experience (UX) for the enterprise that leapfrogs mobile will ultimately win big in the enterprise and industrial wearable market.

1.6 MARKET FORECAST

Tractica forecasts that the total market for enterprise and industrial shipments will experience growth from 166,000 units in 2013 to 27.5 million by 2020, representing a CAGR of 108%. The device revenues will grow from \$14 million in 2013 to \$6.3 billion by 2020, representing a CAGR of 140%. The enterprise and industrial wearable market will be a small, but growing part of the total wearables market. While in 2013, enterprise and industrial wearables only accounted for 1% of total wearable device revenues, by 2020, they are expected to account for 17% of total wearable device revenues.

The enterprise market will be the bigger market overall, driven by smart watches and fitness trackers within corporate wellness programs, while the industrial market will be primarily driven by smart glasses. Fitness trackers will continue to see adoption into corporate wellness programs for a few years after smart watches become popular, because of their low price and long lasting battery life. However, by 2018, Tractica expects the value of fitness trackers to start diminishing, as smart watches pack more sensors, offer improved battery life, and provide better value over simple trackers. Most of the other devices, including wearable cameras, body sensors, smart clothing, and other wearables, will see fewer than 10% of their revenues coming from enterprise and industrial segments.

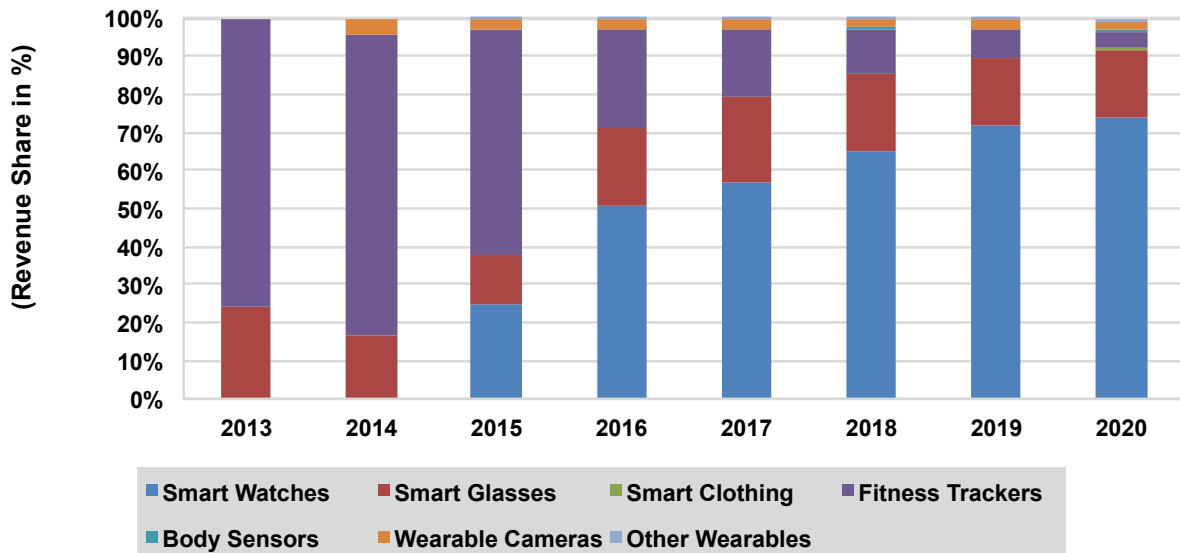
Chart 1.1 Enterprise and Industrial Wearable Shipments and Revenues, World Markets: 2013-2020



(Source: Tractica)

Smart glasses will find the majority of usage in warehouse type environments for scanning bar codes and providing directions for where to store and stack deliveries, field service technicians for recording on-site issues, and accessing step-by-step workflow instructions, as well as for first-person views of video conferences. Wearable cameras will see usage in industrial environments or field service environments where security footage is required. Body sensors, including headbands and posture monitors, are likely to see adoption in enterprise settings. The main application within the enterprise would be around managing stress and corporate wellness of employees. In the other wearables category, gesture control devices are expected to see the largest uptake in enterprise and industrial settings. The Myo armband is the best known gesture control device today; however, there will likely be other kinds of gesture control devices that will primarily be used to control machines, robots, computers, or other wearables.

Chart 1.2 *Enterprise and Industrial Wearable Revenue Share by Device Type, World Markets: 2013-2020*



(Source: Tractica)

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SCOPE OF STUDY

This Tractica report covers the market for enterprise and industrial wearables, providing comprehensive coverage of the various wearable device types, their specific roles, and adoption timelines in the workplace. The devices covered include smart watches, smart glasses, fitness trackers, smart clothing, body sensors, wearable cameras, and other wearables. The report also includes market sizing and forecasts from 2013 through 2020, providing shipments and revenues, while segmenting the market by device type, region, enterprise, and industrial use cases.

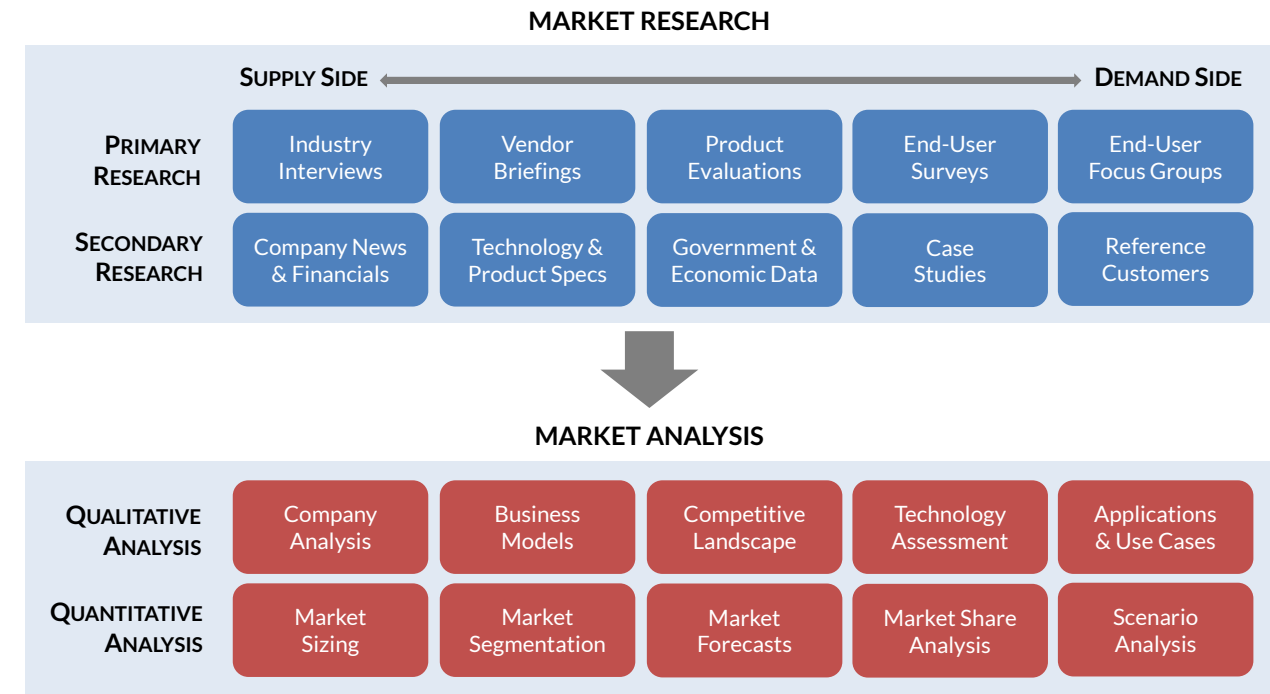
SOURCES AND METHODOLOGY

Tractica is an independent market research firm that provides industry participants and stakeholders with an objective, unbiased view of market dynamics and business opportunities within its coverage areas. The firm's industry analysts are dedicated to presenting clear and actionable analysis to support business planning initiatives and go-to-market strategies, utilizing rigorous market research methodologies and without regard for technology hype or special interests including Tractica's own client relationships. Within its market analysis, Tractica strives to offer conclusions and recommendations that reflect the most likely path of industry development, even when those views may be contrarian.

The basis of Tractica's analysis is primary research collected from a variety of sources including industry interviews, vendor briefings, product demonstrations, and quantitative and qualitative market research focused on consumer and business end-users. Industry analysts conduct interviews with representative groups of executives, technology practitioners, sales and marketing professionals, industry association personnel, government representatives, investors, consultants, and other industry stakeholders. Analysts are diligent in pursuing interviews with representatives from every part of the value chain in an effort to gain a comprehensive view of current market activity and future plans. Within the firm's surveys and focus groups, respondent samples are carefully selected to ensure that they provide the most accurate possible view of demand dynamics within consumer and business markets, utilizing balanced and representative samples where appropriate and careful screening and qualification criteria in cases where the research topic requires a more targeted group of respondents.

Tractica's primary research is supplemented by the review and analysis of all secondary information available on the topic being studied, including company news and financial information, technology specifications, product attributes, government and economic data, industry reports and databases from third-party sources, case studies, and reference customers. As applicable, all secondary research sources are appropriately cited within the firm's publications.

All of Tractica's research reports and other publications are carefully reviewed and scrutinized by the firm's senior management team in an effort to ensure that research methodology is sound, all information provided is accurate, analyst assumptions are carefully documented, and conclusions are well-supported by facts. Tractica is highly responsive to feedback from industry participants and, in the event errors in the firm's research are identified and verified, such errors are corrected promptly.

Chart 10.1 Tractica Research Methodology


(Source: Tractica)

NOTES

CAGR refers to compound annual growth rate, using the formula:

$$\text{CAGR} = (\text{End Year Value} \div \text{Start Year Value})^{(1/\text{steps})} - 1.$$

CAGRs presented in the tables are for the entire timeframe in the title. Where data for fewer years are given, the CAGR is for the range presented. Where relevant, CAGRs for shorter timeframes may be given as well.

Figures are based on the best estimates available at the time of calculation. Annual revenues, shipments, and sales are based on end-of-year figures unless otherwise noted. All values are expressed in year 2015 U.S. dollars unless otherwise noted. Percentages may not add up to 100 due to rounding.

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