



SIGNALS FOR STRATEGISTS

## **Workforce superpowers**

Wearables are augmenting employees' abilities

David Schatsky and Navya Kumar

Wearable technology can augment workers' physical and perceptual abilities and help keep them safe. It's time for companies to assess the potential of this technology and consider its impact on workforce planning.

IT'S NOT ONLY pessimistic sci-fi authors who have long envisioned a jobless future—plenty of analysts worry that robots may someday make human workers obsolete.<sup>1</sup> But this overlooks a crucial trend: Technology is already making workers *more* valuable by enhancing their physical and perceptual abilities. A new generation of wearable technologies is giving workers superhuman strength, endurance, vision, hearing, and awareness. Wearables are enhancing workers' effectiveness and productivity and helping to keep people safe. Far from making workers obsolete, these technologies can improve their productivity, help them overcome physical limitations, or compensate for spotty skills. And they give employers new ways to plan for the workforce of the future.

## Signals

- Older workers are participating in the workforce in greater numbers: By 2026, 37 percent of those aged 65 to 69 years will be actively employed, versus 22 percent in 1996<sup>2</sup>
  - Annual workplace injury costs have reached almost US\$60 billion in the United States<sup>3</sup>
  - Enterprises in the automotive, chemicals and materials, mining, and oil and gas industries are using wearables to improve worker safety while enhancing the quality and efficiency of their work
  - Wearables are also driving workplace productivity and well-being in nonindustrial settings such as health care, retail, travel, financial services, and real estate
  - Leading technology and industrial products companies offer a range of wearable workforce solutions
- Venture capital investment in wearables startups totals around US\$6 billion since 2014<sup>4</sup>
  - The global market for enterprise wearables—including smart watches, smart glasses, hearables, and exoskeletons—is expected to grow 41 percent annually to exceed US\$60 billion in 2022<sup>5</sup>

## New world of work, new technologies

The impact of technology on work has always been double-sided. Some technologies have eliminated jobs and displaced workers; others have made workers more productive. Making workers more productive and more capable is the promise of wearable technologies. Early signs suggest that wearables could have a significant impact on the workforce and the companies that employ them.

It's particularly important to understand how this plays out at a time of rapid technological change and one in which the workforce is changing in important ways. For instance, in developed economies, the workforce is aging,<sup>6</sup> employers face shortages of employees with desired skills,<sup>7</sup> remote working is on the rise,<sup>8</sup> and regulators are carefully scrutinizing workplace safety.<sup>9</sup>

Wearable technologies such as smart watches, smart glasses, hearables, and exoskeletons can help company leaders navigate these challenges by augmenting workers' physical and perceptual capabilities, amplifying their physical strength, lucidly conveying detailed task instructions as needed, facilitating virtual interactions, and alerting for hazards. All of this has the potential to significantly boost productivity<sup>10</sup> and safety.

## ADVANCES IN ENABLING TECHNOLOGIES ARE PROPELLING THE MARKET FOR WEARABLES

Advancements in technologies such as robotics, the Internet of Things (IoT), and augmented and virtual reality (AR and VR) are driving enterprise adoption of wearables by improving their viability and utility: The hardware, including sensor modules, smart glasses, and exosuits, is getting smaller, lighter, and more affordable. Crucially, newer hardware is also offering longer battery life. A growing ability to capture and process complex data in real time, including voice and gestures, is making wearables easier to use. And vendor offerings of wearables-as-a-service and as end-to-end solutions are making them easier for enterprises to adopt.<sup>11</sup>

## The digitally enhanced workforce

Various forms of wearables are finding use in diverse settings, from manufacturing and construction sites to research labs and offices. This can bring benefits to workers and their employers in several ways.

### ENHANCING STRENGTH AND ENDURANCE

Some businesses that employ physical labor are equipping their workers with exoskeletons that aim to support the body, helping employees conserve energy and avoid strain—for instance, they can also transfer the weight of heavy loads to the ground or to different muscles to boost strength and endurance. This is particularly useful in the context of an aging workforce.

At Ford, exoskeletons enable manufacturing workers—some over 50 years old—to engage in prolonged efforts with less fatigue.<sup>12</sup> And at Lowe's

hardware stores, exoskeletons help workers easily lift heavy objects.<sup>13</sup>

Because they provide muscle support, exoskeletons can help workers avoid overexertion—the leading cause of disabling workplace injuries, accounting for nearly US\$14 billion in annual compensation costs for businesses.<sup>14</sup> Organizations such as automaker Audi,<sup>15</sup> construction company Gammon,<sup>16</sup> and the US Navy<sup>17</sup> are evaluating or using exoskeletons.

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### AUGMENTING VISION

Augmented and virtual reality can amplify workers' powers of perception. As we have written elsewhere, a growing number of businesses are finding applications for these technologies to guide workflow, collaboration, and productivity.<sup>18</sup>

Overlaying contextually relevant information such as instructions and explanations in a worker's field of view can enable him or her to work faster and with better quality. For example, at GE Aviation, smart glasses ensure that mechanics need not stop work to check reference manuals, thus improving efficiency by 8 to 12 percent while reducing errors, potentially saving millions.<sup>19</sup>

Rich visualization capabilities afforded by wearable AR or VR devices can augment staffers' design and data analysis abilities. For instance, Pfizer's researchers can absorb complex data about protein structures more quickly by virtually stepping inside molecules, studying them up close and from every angle.<sup>20</sup>

AR can also make collaboration more cost-effective by giving people the ability to see remote

activities in real time. While repairing equipment at bottling plants, Coca-Cola technicians use smart glasses to share their visuals with remotely located experts for advice;<sup>21</sup> this reduces delays and costs involved in flying in those specialists to the site.

## EMPOWERING SPEECH AND HEARING VOICE

Connected hearables and voice-controlled wearables can bring instant, hands-free access to instructions and other information with the intuitive ease of speech. This can not only empower less skilled workers but increase efficiency by making workers more productive.

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For instance, at Lufthansa, voice-based headphones enable a single technician to accomplish the maintenance work that earlier required two. Previously, in teams of two, one person would read out instructions, while another would execute them and report status, which the first would then write down. With the wearable, the maintenance checklist gets converted to voice commands conveyed to a technician's headphones; the technician then executes the tasks and speaks out the status, with that speech automatically converted into data and stored.<sup>22</sup>

Voice wearables can also transform customer service. At Air New Zealand, with wireless headphones connected to machine learning-enabled live translation capabilities on a smartphone, staff can understand customers speaking in any of 40 languages.<sup>23</sup>

## IMPROVING AWARENESS

Connected wearables can provide quick task and situational awareness to workers to increase their productivity and work quality. At Cincinnati/Northern Kentucky International Airport, smart watches alert cleaning crews when and where they are needed. Dynamic task scheduling produces cleaner facilities than fixed rounds did, resulting in better traveler experience.<sup>24</sup>

Wearables can help improve worker safety as well by monitoring the wearer's physical status and environmental conditions and raising alerts when conditions become dangerous. At a Fujitsu factory, smart wristwear issues alerts at signs of heat stress,<sup>25</sup> while at a mining company, smart helmets detect driver fatigue. There is significant economic potential here: US businesses spend nearly US\$1 billion per week compensating for workplace injuries.<sup>26</sup>

Corporate wellness programs may be able to improve staff health and reduce health care costs by introducing such devices as data-driven motivators. For instance, with Fitbit, the Dayton Regional Transit Authority helped employees improve glucose and cholesterol levels while saving more than US\$2 million in health care costs.<sup>27</sup> One projection sees 90 percent of enterprise wellness initiatives including fitness trackers by 2021.<sup>28</sup>

## Implications for enterprises

In augmenting human physical and sensory capabilities, wearables may change the game for organizations that struggle with skill shortages or aging workers and yet find full automation infeasible due to high costs, process complexity, or simply the fact that some work is best done by people rather than robots.<sup>29</sup> By supporting workers and embodying skills and abilities they may lack,

wearables can expand the labor pool available to employers and reduce the time required to train workers for new tasks.

Effective deployment of wearables requires technology leaders to work alongside operations leaders to integrate the new tools into existing enterprise technology systems; some workflow procedures will no doubt need to be tweaked to incorporate employees' new capabilities—for instance, aiming to digitize maintenance steps so they can be displayed over smart glasses or read over smart hearables. Additionally, organizations face cybersecurity and governance concerns related to wearable data transmission and storage. Depending on how wearable data is used, it may be considered protected health information under HIPAA regulations.<sup>30</sup>

Change management programs to support the deployment of wearables in the workforce should include more than training—they may need to anticipate and address employee concerns over privacy and data usage: According to a recent UK study, many workers are concerned about surveillance through wearables or “Big Brother watching.”<sup>31</sup> And plenty fear workplace discrimination based on

health data captured from wearables.<sup>32</sup> This suggests that leaders may need to clarify to workers how employers intend to use wearables—and how personal data will be protected. It's more likely that people will be enthusiastic if they understand how anonymized and aggregated data from wearables can inform work design, staffing, and other decisions to the benefit of employees as well as the organization.

## WEARABLES IN YOUR WORKPLACE

In the coming months and years, we'll likely see wearables take even more forms and combine a wider range of emerging technologies. For now, their core utility remains to ensure the safety and augment the capabilities of workers. They are gaining traction. In manufacturing alone, half of 1,100 recently surveyed global enterprises plan to deploy these technologies by 2022.<sup>33</sup> It's time for companies not already utilizing wearables to assess their potential and to rethink workforce planning in light of the impact these technologies can have. After all, what employer wouldn't want a workforce with superpowers?

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