Human Augmentation Will Demand New HCM Technology Strategies

Published 12 May 2020 - ID G00720767 - 13 min read

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Initiatives: HCM Technology Transformation

Human augmentation opens doors to improving individual performance and productivity. However, its impact will push organizations into uncharted territories where pathbreaking new strategies need to be adopted by application leaders to stay competitive in the new ways of working.

Overview

Key Findings

- In the future, the impact of human augmentation (HA) will be all-encompassing across routine and nonroutine jobs. However, the aftermath will vary according to the complexity of a particular job profile and its suitability of being enhanced by augmentation.

- Even though human augmentation can lead to previously impossible levels of performance, the effects of prolonged usage need to be evaluated before mainstream adoption.

- Current levels of data privacy and employee personal data usage ethics in human capital management (HCM) technology are unprepared for scenarios where the definition of “human” may blur to include augmentations such as prosthetics and other enhancements.

Recommendations

Application leaders responsible for preparing an HCM technology transformation strategy ready for “architected humans” should:

- Construct a roadmap to enable new HR governance models and a nonhierarchical organization structure to replace traditional frameworks if the latter cease to be fit-for-purpose.

- Assess the impact of human augmentation on different job profiles, considering factors such as skills gaps and financial and nonfinancial incentives, to establish a meaningful talent management strategy.

- Invest today in advanced technologies such as blockchain for data security and privacy management tools that build trust among employees to prepare the future of HCM technology for disruptive times.
Strategic Planning Assumptions

By 2023, the number of people with disabilities employed will triple due to AI and emerging technologies reducing barriers to access.

By 2030, 25% of all organizations with more than 1,000 employees will invest in either physical or cognitive augmentation (or both) to improve productivity.

By 2040, 30% of the world's population will be enhanced with biosynthetic devices on or inside their bodies.

Analysis

Human augmentation spans several technical fields and methodological approaches, including experimental psychology, human-computer interaction (HCI) and psychophysiology. Augmentation involves various strategies for optimizing and controlling cognitive states or building biomimetic devices that either resemble or enhance physical body parts. The journey started as early as the year 1505, when Leonardo da Vinci designed the Ornithopter contraption, which aimed to provide humans with flying ability. The journey continues today in several new directions, such as Elon Musk’s Neuralink, which aims to allow an individual to interact with a computer on a neural level.

Based on development to date, there are three major categories of human augmentation that are likely to be foundational roots for further development (see Figure 1):

**Physical:** Enhances humans by increasing their physical capabilities by using, for example, augmented reality, virtual reality, exoskeletons, implants (which may incorporate NFC) and even genetic engineering

**Cognitive:** Enhances a human’s ability to think and make decisions by using, for example, neurostimulation, augmented intelligence (humans and artificial intelligence working together to enhance cognitive performance, including decision making, learning and new experiences) and smart drugs

**Cultural:** Trains and encourages employees to be more innovative and diverse in their thinking, and to use design thinking and take a human-centered approach

Figure 1: Human Augmentation Branches and Examples of Commercial Activities
Once the experimental phases start producing tangible results, organizations are likely to see HA coming into their workforce in two ways:

Organization piloting HA — Even though we are years away from mass-produced cognitive implants or exoskeletal devices, the appeal for improvement in performance could be alluring for organizations to pilot HA in some selected operations.

Employees with bring-your-own-augmentation (BYOA) tools — A section of society may become early adopters and leverage the technology available at the consumer level. This may include people with disabilities who are both wealthy and tech savvy, and thus can afford the consumer technology available (presumably at a high cost).

It is difficult to predict how HA may affect the future of work because it raises questions that HR leaders have never had to deal with before, such as:

What happens when a candidate performs much better than others because of a cognitive implant?

How does HR modify employee performance management for a supposedly perfect “architected human” employee?
How do organizations decide who receives employer-sponsored augmentation?

How do you decide the ownership of the data generated by the physical and cognitive enhancements of an employee?

HCM technology has seen periods of fundamental change over the years; the latest is the advent of cloud HCM suites. However, basic HCM operating models and metrics remained the same because they always centered around the needs, strengths and weaknesses of “humans.” But the definition of “human” may change and blur with “architected humans.” Evidently, the core components of the HCM technology strategy will need to be adjusted as well. In the below sections, the implications of HA proliferation and guidance for HCM scenarios have been charted out for both routine and nonroutine jobs (see Table 1 and Figure 2). Even though there are chances that cognitive and physical augmentations might combine in some distinct cases, Gartner expects that to happen in only limited scenarios, such as defense or aeronautics, and not on a mainstream level in the near future.

### Table 1: Job Profile Categorization According to Complexity

<table>
<thead>
<tr>
<th>Job Profile Complexity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine</td>
<td>Job profiles that follow a pattern and do not deviate significantly in day-to-day modus operandi. Involves a medium level of complexity in decision making, e.g., shop floor maintenance, assembly line operation.</td>
</tr>
<tr>
<td>Nonroutine</td>
<td>Job profiles that need a high level of academic qualification or involve complex decision making, such as subject matter experts, artists or individuals working in a sedentary work environment.</td>
</tr>
</tbody>
</table>

Source: Gartner

**Figure 2: Human Augmentation Implications in Routine and Nonroutine Jobs**
Quadrant 1: Cognitive Augmentation in Nonroutine Jobs

Augmentation can possibly equip employees with a “cape” of superability. However, a cognitive augmented team performing nonroutine jobs will resemble a star soccer team rather than a league of superheroes.

It has been debated for years whether a brain computer interface (BCI) can equip employees with all the available resources from online databases and turn them into superemployees. However, research indicates that alliance between a hardware implant and brain is not as simple as portrayed in science fiction movies. In the 2011 movie *Limitless*, actor Bradley Cooper portrays a struggling author who alleviates all his creative problems by simply injecting a secret drug. In reality, cognitive augmentation needs an adaptive mitigation layer that understands the user and calibrates the system accordingly. As seen in prototype designs, AI is proving to be the interface or the mitigation layer between a cognitive transplant and a human.

Therefore, it's highly probable that certain individuals will be more adept at working with cognitive augmentation than others. In such a condition, there could be a group of individuals who are likely
to perform much better than the rest of the employees. Many organizations could therefore form teams with high-functioning employees for certain projects or solely recruit individuals with such expertise. Teams that consist of high-functioning individuals are likely to be different than a regular team. However, a team of high-functioning individuals is unlikely to perform as a team of superheroes and likely to resemble a star soccer team (see Table 2).

### Table 2: Cognitive Augmentation in Nonroutine Jobs

![](image)

**Will Cognitive Augmentation in Nonroutine Jobs Give Rise to the Cult of the “Superemployee”?**

Nonroutine job profiles already have employees with higher cognitive abilities. But a team of such employees will resemble a star soccer team rather than a league of superheroes, because:

- Augmentation adaptability will vary the widest in range in this quadrant. However, a high-performing employee will not be unique or irreplaceable, even though highly revered.

- A team will consist of individual nonoverlapping roles with specific duties akin to "center forward" or "attacking midfielder."

- Organizations should focus on building a culture or a philosophy rather than solely depend upon financial incentives. For instance, the culture of playing stellar soccer attracts the top global talent to the academy of Barcelona FC in Spain.

Source: Gartner

#### Possible Scenarios for Job Profiles in Quadrant 1

- A traditional organization hierarchy and performance model would not hold true. Organizations are likely to build a team of individuals defined by their roles to work together for a common mission and project. This will resemble a holacratic structure, where there is no hierarchy and instead of designations, roles and a set of responsibilities take precedence.

- Some organizations that thrive on innovation would likely be forming a consortium, where star resources akin to a star quarterback or a soccer striker would be transferred or swapped.

- Employees would likely be more attracted to the organization mission statement and culture than what it sells or makes.

#### Impact on HR and HCM Technology Strategies

- Many traditional HR functions may become irrelevant — for example, a recruiting process replaced by a consortium exchange or employees no longer relying on binary one-up promotions. So, there lies a possibility of the HR department being replaced by an ethics committee.
All applications connected to an employee's work-related activities should monitor augmentation's prolonged usage and employee well-being.

A meaningful rewards strategy that has nonfinancial rewards such as employee work-life balance would be prioritized over one that heavily relies on financial premiums.

Data privacy and employee personal data security would no longer be a compliance checklist but may prove to be a differentiator for the organization.

**Recommendations for HCM Application Leaders**

- Pilot a rewards strategy initiative with a focus group that tracks the feedback and behavior of employees on a nonfinancial incentives program.

- Consider the effect of HA on your HCM tech portfolio, such as the need to track augmentations by employee and relative applicability to a given role. Ensure privacy of employee data related to HA (especially if the employee doesn't want the HA to be publicly known).

- Assess your architecture's readiness to adapt a different organizational structure such as holacracy, heterarchy or wirearchy if needed.

- Include employee wellness as an integral part of the HCM application strategy, incorporating a comprehensive model of well-being that enables employees to flourish.

**Quadrant 2: Physical Augmentation in Nonroutine Jobs**

Augmentation can possibly act as a “steroid.” Innovative design will drive the adoption of physical augmentation in nonroutine jobs.

There are many exemplary stories of custom-made prosthetics or artificial limbs that have made fairy-tale-like career achievements possible for athletes who lost limbs due to injuries or accidents: Oscar Pistorius winning the 2011 world championship with his “Blade Runner” legs or Alex Zanardi returning to FIA with a modified BMW car specially designed for him. Augmentation strategies in enterprises may not be so personalized to suit a single person's behavior or disadvantage. However, there is a possibility of employees bringing their own enhancement to uplift performance in their daily work. This may cause disagreement in the workplace, where some employees may raise the question, “Is it fair that one reaches a higher level of performance through augmentation?” HR professionals may also face the dilemma while recruiting to treat a candidate who uses a device such as Google Glass on the same level with another. Organizations are thus expected to follow generally accepted workplace principles and enable access to augmentation devices for employees who have the flair for being creative with technology.

**Possible Scenarios for Job Profiles in Quadrant 2**
A mechatronic arm or digits can make sophisticated operations such as surgery or sculpting possible with a greater level of performance.

A cochlear implant or speech enhancement program can make speaking and communicating a foreign language easy and remove ethnic- or region-based barriers for inclusion.

**Impact on HR and HCM Technology Strategies**

- It's important to establish ethical guidelines around employees’ readiness and comfort with prosthetics. Not every employee will likely be comfortable working with an external contraption. Organizations should work with employees to ensure the correct level and limit of augmentation.

- Innovative designs for augmentations should determine adoption success. There is a stigma associated with external implants and wearables. Organizations should ensure that the manifestations of these implants are such that they merely look and feel like an extension of a human feature and not something similar to a cyborg. If the most appropriate design of the prosthetic is indeed non-human-like, the organization should ensure that employees are not discriminated against by peers for using it.

- As augmentations stretch performance, it's important to understand the optimal limit for the well-being of an employee. Organizations can be greedy to push the limits for results, but HCM should play a key role in ensuring ethical guardrails in such situations.

**Recommendations for HCM Application Leaders**

- Assess the roadmap of your current HCM vendors to address the concerns for employee trust and employee data privacy. There is a possibility of tremendous amounts of data generated from the wearables or extensions deemed as private; storing them in the organization server might seem invasive.

- Invest in technology like blockchain that builds trust by not hoarding data in a central system and enables a shared decentralized mode of data keeping.

- Include components such as fatigue management (traditionally associated only with an hourly workforce) as part of HCM application strategy to prevent any adverse countereffect of physical augmentation.

**Quadrants 3 and 4: Augmentation in Routine Jobs**

Routine jobs will need greater employee engagement to adjust to the disruption. Augmentation will resemble enhanced “eyeglasses” or serve as a safety “guardrail.”

Even though nonroutine job possibilities seem more appealing to the imagination, HA is likely to proliferate sooner in routine jobs, per previous automation eras. Physical augmentation is likely to enhance stamina and strength or keep employees coming up the learning curve through AR/VR
tutorials (whereas cognitive augmentation could help employees analyze a situation through sensory or haptic vision and provide guidance, thus ensuring safety and security). One adverse effect of this exercise to employees would be the lowering of the skills gap as physical augmentation might substitute for years of practice to build expert hand techniques needed for crafting. Similarly, a cognitive implant can substitute for experience or skills in repeatable tasks. The disappearance of the skills gap could be inevitable, but employees can still bring innovation through creative use of augmentation. Organizations should prioritize use cases that guarantee employee safety in order to secure buy-in. Some Japan-based prosthetic design companies (e.g., Cyberdyne, exiii and Xiborg) have created exoskeleton beta prototypes (artificial limbs, electronic arms) that have helped amputees or prevented workplace-related injuries.

Impact on HR and HCM Technology Strategies

- As the skills gap disappears, employees can feel like expendables and become insecure about their jobs. It’s important to remember that employees may still seek belonging, security and support from management.

- Cognitive augmentation in decision making could feel condescending and invasive in some situations, so organizations should bring in a consensus mechanism in the form of an ethics subcommittee to determine the limit of invasiveness.

- Physical augmentation could also pave the way for greater participation from people with disabilities and elderly communities in the workplace. They should be well-represented in the communities so that they feel included.

- Organizations could form a team of heterarchical employees who work on different projects when required.

Recommendations for HCM Application Leaders

- Identify top use cases where employees can be trained on new methods and operating procedures in real time through AR/VR technology.

- Ensure that a voice of the employee (VoE) survey is conducted periodically to review the health and safety of employees around the workplace.

- Conduct hackathons to identify the digital dexterity level of your employees to adopt to new technology and leverage it in a productive manner.

Evidence

1 “An Integrative Introduction to Human Augmentation Science.” Orthogonal Research Lab; OpenWorm Foundation.

Recommended by the Author
Maverick* Research: Architecting Humans for Digital Transformation
Predicts 2020: AI and the Future of Work
How We Will Work in 2028 Demands Changes in How We Will Reward
Inclusive Design for Disability Will Lead to Augmented Human Innovation Breakthroughs
Maverick* Research: Being Human 2040 — The Life of the Architected Human in a More-Than-Human World

Recommended For You
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Recommended Cost Optimization Strategies and Tools for HR Leaders
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Recommended Cost Optimization Strategies and Tools for Audit Leaders

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