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Technology Forecast: **Virtual reality**
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Five ways virtual reality delivers business value

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Unlock greater agility, fewer risks, and new ways of working when you open up the enterprise to a new digital reality

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Suspending reality by taking advantage of VR can allow businesses to find a new groove for their operations, one that takes a symbiotic view across virtual and real operations.

While most of the discussion today around virtual reality (VR) centers on consumer-level solutions like gaming and entertainment, business applications like those that speed and improve product design hold great promise.

VR technology has evolved to the point where graphics resolution, video refresh rates, motion tracking, and latency levels have brought VR into its own as a truly usable technology. With prices on VR gear becoming much more affordable—particularly now that smartphones can double as VR headsets—virtual reality is evolving to have legitimate business value.

With enterprise VR, businesses can put people into a virtual world populated by information that is otherwise difficult to parse, particularly 3-D imagery. In this type of scenario, spatial data becomes more real and more actionable. Over the longer term, by creating an interactive, digital alternate of your business reality, VR provides new tools to transform operations. Actions in the virtual world are generally less expensive, are more flexible, and can happen faster than in the real world.

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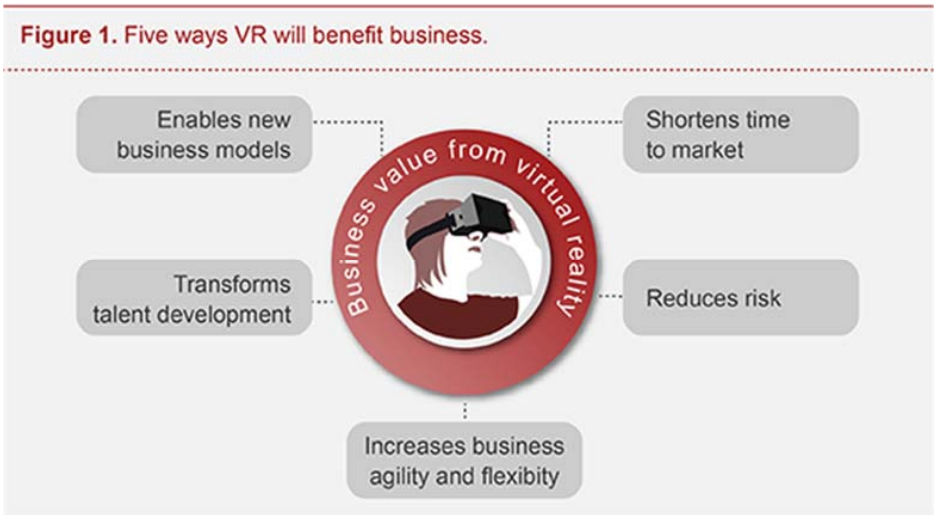
VR's potential: Five ways businesses could benefit

Mass-market acceptance may be several years away, but early proof points for the business legitimacy of VR are already here. As Figure 1 shows, VR is adding value to the enterprise in several ways.

1. Shortens time to market

Traditional product design can be complex and time consuming. A new design might be sketched by hand, then modeled and refined by using computer-aided design (CAD) and other computer software. A tangible prototype might then be constructed to check for form, function, and fit and to run other tests. All of these steps take time.

Figure 1. Five ways VR will benefit business.



VR allows an end run around this cumbersome process. Through VR technology, a CAD rendering can easily be brought to (virtual) life in a VR environment. Designers, managers, and potential users can see the product from every angle, interact with it, and make changes—all without ever creating a physical model. Because changes can be made quickly (and often immediately, on the fly), VR reduces the amount of time required to develop and finalize a new product design—and enables a digital version of rapid prototyping.

When new products are designed in a VR space, a company can wait until later in the process to commit to a final design, giving management more flexibility and control.

The time-shortening impact of VR can be felt particularly strongly in the world of architecture and construction. Consumers of architectural drawings often have difficulty visualizing the typical top-down designs, which is one reason why construction projects often take so long: if the finished product doesn't match what the buyer envisioned based on the 2-D design, the work must be done again.

Shane Scranton, CEO and cofounder of IrisVR, is working to translate architectural designs to the VR world. He was intrigued by the initial industry response to VR. He explains, "We saw the amount of excitement in the industry, we saw a willingness to pay for it, and we saw a willingness to invest in early technology." Within a few years, it may be commonplace for people to have a VR walkthrough of their new office building, warehouse, or department store before the first brick has been laid.

2. Reduces product design risk

VR doesn't just make the design process faster, it makes it better. The flexibility of VR-based design systems gives product developers the flexibility to experiment and iterate quickly, fail fast, and catch errors before they are ever built into a real-world product. The result is that when first-generation products are finally released, they are more mature, customer satisfaction is higher, and the company handles fewer expensive, post-release issues like product recalls.

A popular emerging VR application—home design—also reduces risk. In Lowe's Holoroom, customers can use technology developed by Marxent to design a new kitchen and walk through the room in 3-D. "They can try out different options," says Sonia Schechter, chief marketing officer for Marxent. "They might say, 'Let me see what cherry cabinets look like versus white cabinets.' Lowe's Holoroom concierges help to make any adjustments to the design." The upshot: customers can evaluate more alternatives, refine the design within the VR program, make decisions that eliminate future rework, and are happier with the finished project.

3. Increases business agility and flexibility

Alongside speed and cost savings, another competitive advantage VR offers is business agility. If a company must respond to market conditions, VR gives a company more alternatives. A VR environment can allow a company to quickly evaluate various scenarios without investing in real-world pilot projects. When new products are designed in a VR space, a company can wait until later in the process to commit to a final design, giving management more flexibility and control.

Because VR can simulate real situations in a virtual environment, it is a natural technology to use for employee training and therefore will be transformative in talent development.

At Ford, for example, all vehicles now go through its VR-based Ford Immersive Vehicle Environment (FIVE).[1] Speaking to *Fortune*, Ford senior technical leader Jeff Greenberg says that VR has "allowed our designers and engineers more creative freedoms to explore options that in the past would have been too time- or cost-intensive to consider."[2] With FIVE, Ford can go through more vehicle configurations and make decisions earlier in the design process.

4. Transforms talent development and training

Because VR can simulate real situations in a virtual environment, it is a natural technology to use for employee training and therefore will be transformative in talent development. VR shines particularly when training in the real world is costly, hazardous, or otherwise difficult, such as in dangerous industrial settings or when expensive materials are involved. Flight simulators represent the most mature example of VR-based training, but they're just the beginning. "I think use in the medical field will be absolutely massive, especially for medical training," says Scranton. "Why not perform surgery on a digital model before you go into the operating room?"

VR training has wide applicability in a number of environments. Simulators in development let people experience virtual mining,[3] welding,[4] and emergency response services.[5] Using VR to train workers on how to respond to a nuclear reactor crisis, for example, carries tremendous advantages. Simulations don't need to involve risk of life and limb: STRIVR Labs is developing immersive simulators for training professional sports competitors to help improve their performance.[6] PwC Australia is experimenting with VR to give employees a quick stress-busting mini-vacation at their desks, with the goal of improving employee wellness.[7]

5. Enables new business models

Perhaps the biggest enterprise impact of VR is that, for many companies, it can open up new revenue streams by opening up new business models.

At Lowe's, the VR technology of the Lowe's Holoroom further advances the company's efforts to making home improvement projects simple and seamless for the customer. In the process, Lowe's customer relationship can expand from selling individual products to complete projects. The time and effort of creating a custom design with the consumer creates customer intimacy that was not possible before. It even opens up new avenues of data analysis that didn't exist previously.

[1] "Ford's Immersive Vehicle Environment," The Ford Motor Company, https://media.ford.com/content/fordmedia/fna/us/en/asset.html/content/dam/fordmedia/North%20America/US/2013/12/12/VirtualWall.mov.html, accessed June 14, 2016.
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[3] NORCAT, "NORCAT Partners with Sandvik to Expand Equipment Simulation Training Centre," news release, March 7, 2016, http://www.norcat.org/norcat-partners-with-sandvik-to-expand-equipment-simulation-training-centre/, accessed June 15, 2016.
[4] "guideWELD VR welding simulator," Realityworks, http://realityworks.com/products/guideweld-vr-welding-simulation, accessed June 15, 2016.
[5] Crispin Andrews, "Virtual Reality: The New Training Ground for First Responders," *The Institute*, July 23, 2015, http://theinstitute.ieee.org/ieee-roundup/opinions/ieee-roundup/virtual-reality-the-new-training-ground-for-first-responders, accessed June 15, 2016.
[6] "Making athletes better with virtual reality," STRIVR Labs, http://www.strivrlabs.com/, accessed June 15, 2016.
[7] Hugh Gaukroger, "My virtual reality experience with PwC Australia's vacation program," *LinkedIn Pulse*, March 30, 2016, https://www.linkedin.com/pulse/my-virtual-reality-experience-pwc-australias-vacation-hugh-gaukroger?trk=pulse_spock-articles, accessed June 15, 2016.

"A lot is known about what consumers buy and what their shopping process is," says Schechter. "But you don't know, for instance, all the different products that consumers looked at in a retail store before they bought something. Online, you may or you may not have this information, because they might have looked at a bunch of different sites and not just yours. But if you're merchandising within an augmented reality or virtual reality system, you can see exactly what they traded out, what they tested, what they tried."

IKEA is also testing a similar VR design system, although the IKEA VR Experience is designed for home users to try out IKEA products through their own commercially available VR headsets rather than in the store.[8] The goal is to increase customer "stickiness" by positioning IKEA as a design partner, not just a place to buy furniture.

Barriers to business adoption of VR

The challenges that are holding up adoption of VR solutions in enterprise are similar to those for augmented reality and span the following issues:

Fragmentation in the ecosystem: Many variations in hardware, many operating systems, and many interaction methods

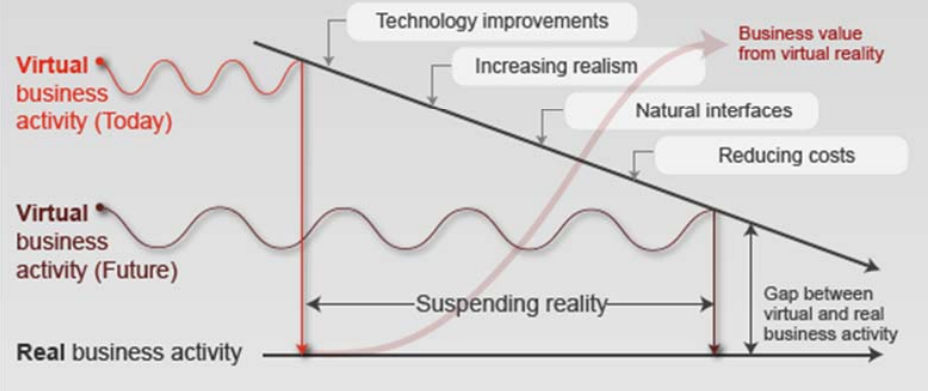
Lack of standards: Standards to describe information, share data, support interactions, integrate systems, and swap components or algorithms

Technical barriers: Improving performance across areas such as optics; 3-D tracking, orientation, and display; interaction; and VR content authoring

Financial barriers: The cost of procuring devices, methods to measure business impact, cost of ownership, and return on investment

Operational barriers: Challenge of introducing new hardware and process change, securing data and the device, and repair and maintenance of the device

Figure 2. As the technology, realism, interfaces, and costs of VR improve, businesses will be able to suspend reality for longer by conducting aspects of their business (design, product development, training, testing, and so on) in virtual environments, thereby extracting greater and greater value from VR.



[8] IKEA, "IKEA Launches Pilot Virtual Reality (VR) Kitchen Experience for HTC Vive on Steam," news release, April 5, 2016, http://www.ikea.com/us/en/about_ikea/newsitem/040516_Virtual-Reality, accessed June 14, 2016.

Considerations for your business

With declining prices, virtual reality technology has become very accessible today. Here are some recommendations as you think about about using virtual reality in your operations:

- **Plan hardware investments.** VR technology is evolving rapidly. In such a dynamic environment, businesses should structure their investments carefully. Invest in VR-ready PCs (such as those for gaming) with top-of-the-line graphics cards. That is where the bulk of the cost is. VR goggles, which are less expensive, can be cycled at a much faster rate as they evolve and change.

- **Identify uses cases that can deliver quick learning and measurable impact.** For many businesses, uses cases in employee training ,3-D simulations, and 3-D visualizations are likely to provide the quickest path to new learnings and impact.

- **Allocate resources to content development.** Success of VR solutions depend on the VR content as much as they do on the hardware. Allocate adequate budget and resources to begin developing content for VR. Depending on the use case, the cost and effort required in developing the necessary VR content can be significant and should be planned for.

- **Leverage and learn from your ecosystem.** Talent with substantial experience in VR solutions is very limited today. Enterprises should tap into the expertise of vendors and third-party service providers to understand this new technology, its use cases, its implications and best practices in adoption.

To have a deeper conversation about virtual reality, please contact:

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