

REPORT REPRINT

OT sees IoT connectivity, AI/ML making biggest new tech impact

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Operations professionals at industrial firms may cast a skeptical eye toward new IT technologies entering their realm, but they do recognize the positive impact of many new developments, led by new IoT connectivity options and AI-enabled analytics.

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Introduction

One of the fundamental underpinnings of industrial IoT (IIoT) is the incursion of traditional IT technologies into the world of operations. Because they've operated siloed from IT for so long, and have so much at stake if their systems go down for even a moment, operational technology (OT) professionals tend to cast a skeptical eye toward new tech – especially cutting-edge. Yet those very technologies – like new IoT networks, user interface developments (such as digital twin or augmented reality), or new analytics approaches centered on artificial intelligence or machine learning – have much to offer enterprises deploying IIoT. But is the impact worth the risk – or even the discomfort?

To assess OT's sentiments about new and emerging IoT-enabling technologies, we asked OT decision-makers to opine about eight emerging technologies: AI/machine learning (ML); digital twin; augmented reality (AR); virtual reality (VR); next-gen connectivity; video analytics/computer vision; autonomous robotics; and no-code application development.

Advances like these aren't absolutely necessary for enterprise IoT, but they offer capabilities that can add substantial value to enterprise IoT deployments and industrial operational environments. So we set out to find out how OT feels about them. Which are the most impactful? What is the timeline for their adoption? What are the drivers that will get them deployed and the barriers that might slow them down? And what are the deep-dive issues that could impact each specific category, such as privacy concerns for video analytics or the path to full autonomy for industrial robotics? The full results and analysis – including impact broken down by OT sectors such as manufacturing, oil & gas, transportation and others – are available to subscribers in our Voice of the Enterprise: IoT: The OT Perspective advisory report. In this Spotlight report, we offer a sneak peek at the top-level results.

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There's a lot at stake when introducing new, potentially disruptive tech into live operational environments, but survey responses from our OT respondents show strong belief in the power of these new technologies to deliver real business value and impact, in many cases on very aggressive deployment timelines. Operations departments have reason to be skeptical about information technology as a panacea. Transformation is nothing new in such environments: enterprise resource planning (ERP), factory automation, supply chain logistics and other software deployment projects have promised to transform industrial environments for decades. And they have had a profound impact – too often at the cost of tens of millions of dollars of cost overruns and years of project delays. To avoid such disappointments, OT and IT must work more closely and collaboratively than ever to deliver the next wave of information technology additions to OT environments. Our survey indicates that OT likes what it can gain from these new approaches; IT's job must be to work closely with OT to deliver on that promise.

Which new IT tech matters most to OT?

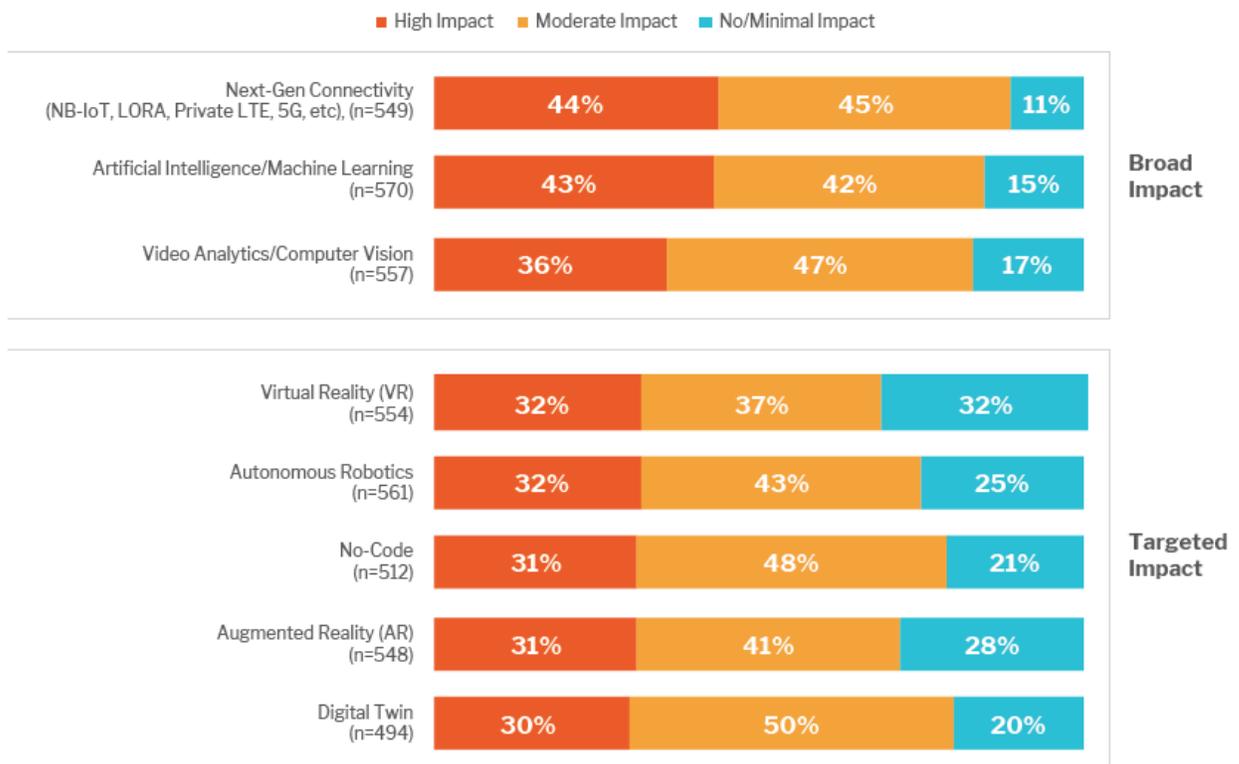
Enterprise IoT initiatives are fueled by a variety of technologies, from baseline infrastructure such as compute and storage deployed edge-to-cloud to a range of newer, at times more esoteric, technologies that serve critical (if unique) roles within an IoT deployment. Based on the results from our survey of OT respondents, the eight IoT-enabling technologies we asked about can broadly be broken into two categories, according to their expected impact (see figure below).

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- **Broad impact:** These technologies (in many cases) are already playing a critical role in IIoT initiatives, and that will likely only increase. Next-gen connectivity, AI/ ML and video analytics take capabilities that are already part of the IoT baseline – connectivity and analytics – and improve them significantly, fostering welcome acceptance among OT pros.
- **Targeted, more limited impact:** Meanwhile, our remaining technologies – such as AR, VR, robotics and so on – are more likely to have a targeted impact for key use cases and industries, but less likely to be broadly impactful given their more specialized uses.

Networks, AI/ML, Video Analytics Make Biggest IoT/OT Impact

Source: Voice of the Enterprise: Internet of Things: OT Perspective, April 2020



Q. Overall, how much of an impact – if any – do you think each of the following will have on your organization's operations?

Base: All Respondents

IoT connectivity, AI/ML and computer vision make broadest impact

Next-gen connectivity – which includes low-power, wide-area options like NB-IoT and LoRA; new deployment scenarios like private LTE; and altogether new networks like 5G – is believed to have a high impact by 44% of respondents and a moderate impact by another 45%. That means just under 90% of OT professionals expect new modes of network connectivity to have an impact on their IIoT efforts, making the expected impact almost universal. Connectivity has not been a major linchpin of traditional operational environments, as likely air-gapped from the outside world as connected to it. While specialty industrial network protocols are critical, the network connectivity itself for industry has largely centered on Ethernet and Wi-Fi in-building and relatively limited M2M or 2G/3G network connections across the wide area. Newer network approaches like private LTE with an on-prem

or cloud core and (eventually) segregated, shared 5G network slices bring more intelligence and manageability to on-prem networks, while LPWAN options bring more ubiquitous network availability coupled with improved security and support for low-power-consumption devices. Almost all IIoT environments would benefit from those advances.

Meanwhile, the impact of artificial intelligence and machine learning on IIoT deployments is viewed as just as impactful, with 43% of respondents viewing it as high impact and another 42% as moderate impact. AI and ML have broad and critical applicability to a range of IIoT use cases, enabling and automating the delivery of insight from large collections of IoT data. While some OT professionals express concern about the ability of machine intelligence to replace decades of human worker experience and analysis, the value in being able to intelligently analyze large amounts of rapidly changing industrial data while leveraging machine learning to uncover new insight along the way is hard to argue with.

Finally, while logging a slightly smaller high-impact rating, video analytics/computer vision is expected to have a moderate to high impact on IIoT by 83% of our OT respondents. That high level of impact can be credited to the power of the video camera as an all-contextual sensor and the applicability of video analysis to so many different types of use cases. Video cameras are already ubiquitous in many environments – from analog cameras recording to VCR tape to newer digital systems saving video streams to hard drives. Deriving insight from that video footage via video analytics and computer-vision algorithms enables a range of new IIoT-enabled use cases, from monitoring traffic at city intersections to watching for defects on a factory assembly line.

AR/VR, robots, digital twin and no-code nibble at the niches

The remaining technologies are all expected to have an impact on enterprise IoT deployments – albeit slightly less significantly than our top three, and often more targeted to specific industries and use cases. For instance, the impact of autonomous robots could hardly be less critical in several industrial sectors – they are central to modern manufacturing, and new developments like autonomous vehicles and drones will greatly impact commercial transportation. So while just 32% of overall OT respondents expect autonomous robotics to have a high impact, 42% of manufacturers see a high impact for the technology, with more than half of manufacturing respondents (52%) deploying some level of autonomous robotics already today.

In other cases, technologies that appear to have a more limited ‘targeted impact’ today are likely to be viewed as having a broader impact if we revisit them a few years down the line. For instance, digital twin, viewed by just 30% of OT respondents as having an expected high impact, has up to now been promoted primarily within the manufacturing sector, but digital-twin-driven use cases are rapidly emerging in other verticals as well, such as building a digital twin of urban environments in smart-city applications or modeling traffic flows in transportation use cases. Such scenarios may stretch the original meaning of digital twin, but they make good use of the technology and will likely drive up its expected impact in the future. Elsewhere, no-code application development is a relatively new concept within IoT, registering today as ‘high impact’ with just 31% of OT respondents. That said, the idea of enabling nonprogrammers to more easily digitize critical OT processes without much coding at all will likely hold great appeal to operations teams that need to rapidly deploy new IoT applications or fine-tune ones already in place.