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# Get Control Over Your Bots With Forrester's Automation Framework

## Use Nine Critical Dimensions To Decipher The Automation Landscape

by Chris Gardner and Craig Le Clair
March 6, 2019 | Updated: March 12, 2019

## Why Read This Report

The impact of automation on companies' efforts to win, serve, and retain customers is unquestionable. However, it can be difficult to determine how different types of automation relate to one another, where you might be able to reuse certain technologies, and how best to rationalize your portfolio. Using nine dimensions, Forrester has classified eight major categories of more than sixty types of automation. Infrastructure and operations (I&O) professionals can use this framework to guide their automation journeys.

## Key Takeaways

**The Automation Revolution Drives Digital Transformation**
Technological progress has reached a tipping point, leading to a watershed moment in automation. Automation is no longer optional for excellent customer experience — it's mandatory.

**Nine Key Dimensions Detail The Automation Spectrum**
Using Forrester's framework and its nine key dimensions, you can visualize how certain types of automation relate. Patterns start to emerge between automation technologies in particular categories, indicating the potential for technology reuse.

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by Chris Gardner and Craig Le Clair
with Glenn O'Donnell, J. P. Gownder, Charles Betz, Caroline Robertson, Mike Gualtieri, Ian Jacobs, Laura Koetzle, Amanda Lipson, and Diane Lynch

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## The Automation Revolution Is Here

Half of all companies are currently engaged in digital transformation efforts and are laying the groundwork for the next catalytic revolution — automation.[1] Automation involves a broad set of tools, from AI to robotic process automation (RPA) to orchestrating software-defined infrastructure to physical robots and beyond. I&O leaders will play a key role in implementing automated systems. The automation revolution's impacts will be both progressive and disruptive:

› **Automation will contribute to your customer experience and bottom line.** Forrester predicts that automation technologies will take center stage in digital transformation strategies and budgets in 2019 and beyond.[2] Automation will be the driver for innovation in customer experience. The financial impact varies by how well suited the use case is to the technology chosen. For example, in RPA deployments, for high-volume, low-complexity tasks, enterprises can expect to receive three to four full-time equivalents (FTEs) returned per bot.[3] Lower-volume, more complex tasks return no more than 2.5 FTEs per robotic process.

› **This transformation will forever alter how you conduct business.** Automation provides unprecedented scale at high velocity and with higher quality, offering new opportunities for business model innovation.[4] In infrastructure automation, Red Hat Ansible Tower reduced reconfiguration man-hours by 94%.[5] In physical automation, German battery maker Varta replaced human quality-assurance inspectors with Cognex's automated vision systems, using 3D software and a 3D camera and driving up quality and productivity.[6]

› **The societal impact on humans will be profound.** In the world of AI, smart software, and physical robotics, automation is reaching new jobs, including white-collar ones. However, the impacts, while serious, won't be as apocalyptic as some claim: Forrester predicts that while automation will cannibalize 10% of all jobs in the US economy, it will also create 3% more jobs.[7]

## Understand The Automation Spectrum With The Forrester Framework

Forrester often gets questions about how different types of automation relate. Using the framework, you can compare different types of automation across nine dimensions in three groups: 1) process profile (data acquisition, comprehension, and determinism); 2) enterprise effect (robotics quotient, operating effect, and governance/auditability); and 3) people effect (human-machine interaction, human effect, and conversational intelligence) (see Figure 1). When you compare technologies using these three groups of dimensions, you end up with eight main categories of automation: 1) engagement; 2) sales; 3) marketing; 4) decision; 5) process; 6) industrial; 7) infrastructure; and 8) development. The combined dimensions and categories encompass the automation spectrum (see Figure 2). Click the link in the download box at the beginning of this report on Forrester.com for an Excel tool containing more details about the dimensions of the automation framework.

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**FIGURE 1** The Nine Dimensions Distinguish Different Types Of Automation

The spreadsheet associated with this figure contains additional data.

| **Process profile** | |
| --- | --- |
| Data acquisition | Flexibility for structured/unstructured inputs |
| Comprehension | Learning competence and the maturity of automation |
| Determinism | The ability of a process to independently evolve |

| **Enterprise effect** | |
| --- | --- |
| Robotics quotient | Expertise requirements and organization commitment |
| Operating effect | The balance of centralized and federalized work balance |
| Governance/auditability | The ability to audit and control machine behavior |

| **People effect** | |
| --- | --- |
| Human-machine interaction | The degree and importance of human-machine interaction |
| Human effect | The degree of human change associated with automation |
| Conversational intelligence | The capacity to detect and act on human intent |

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**FIGURE 2** The Forrester Automation Framework
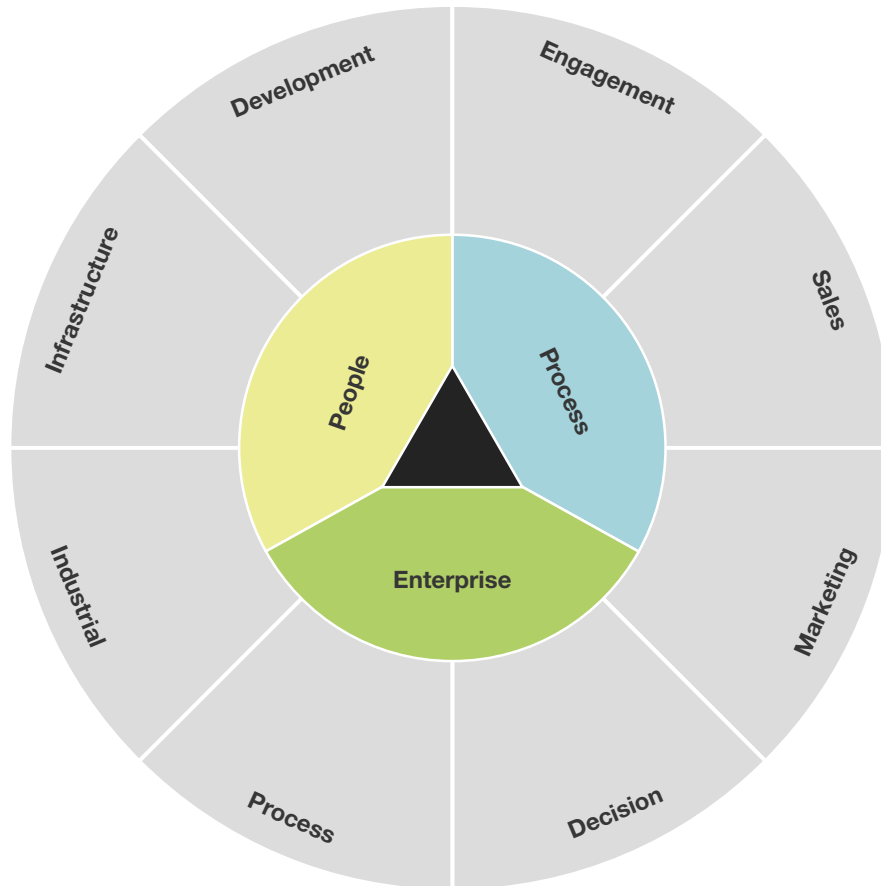


## The Process Dimensions Focus On How Automation Kicks Off And Runs

Before automation can do its job, data needs to enter the system. In the past, this happened through highly defined mechanisms that accepted (and worked in) only code. More recently, unstructured data acquisition and processing is valid. In the process dimensions:

› **Data acquisition describes the acceptable input.** On one end of this scale are tools that accept highly structured data. An example is configuration management of servers, which often require input in particular programming languages. On the other end is automation that accepts highly unstructured data, such as intelligent assistants (e.g., chatbots) that must accept a large variety of variable, human-created input.[8]

› **Comprehension outlines the rules by which automation executes.** In coded comprehension, humans set the rules and automation follows them. Deviation is not expected, and all processes within the system are human-readable. An example is RPA, which follows rules to dutifully reenact

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business processes. The flip side of this is completely cognitive systems. Here, the automation builds and redefines its own rules over time. An example of this is pure machine learning, such as IBM's Watson, which adapts and evolves.[9]

› **Determinism is how you get from point A to B.** Once data is in the system, you must process it. A highly deterministic system follows a specific, predefined workflow: Do A, then B, then C. An example is continuous delivery automation (e.g., Electric Cloud ElectricFlow, IBM UrbanCode Deploy and Release, and XebiaLabs XL Deploy), which always follows a specific pattern to deploy releases from test to production.[10] The opposite is a nondeterministic system, where workflows aren't predefined and the automation itself has flexibility in handling business rules. An example is process mining.

## The Enterprise Effects Outline The Impact To Your Company

Once you decide to implement a particular type of automation, you need to vet its impact on your company and its employees. This requires a thorough examination of the skill of your workers, a justified business case, and a governance plan moving forward. In the enterprise dimensions:

› **Robotics quotient (RQ) indicates your automation readiness.** Some automation requires a thorough understanding of the internal gears to use it, while just about anyone can utilize others. We define this aptitude as RQ.[11] An example of a system that requires a low RQ is sales enablement automation, which employees can use without knowledge of the underlying code. An example that requires high RQ is modifying neural network code — employees need significant knowledge of tools like Caffe or TensorFlow to modify this AI.

› **The operating effect describes the labor impact.** As you implement more automation, you redefine work itself as well as human organization. Automation that has more of a federalized work effect remains focused on the individual. While the automation assists the worker, the work of choosing channels to prioritize and the cost associated with this task remain largely the same. On the other end is automation that has a highly centralized effect, such as functions that are completely embedded in services. Once done, these typically become commodity tasks and no longer require separate funding. An example is configuration management, which usually is embedded into other automation.

› **Governance/auditability indicates how well you can manage your bots.** Once you implement automation, you need to manage and — in some cases — flag it for compliance. On one end of this dimension, humans have complete control and are able to control all decisions and audit as necessary. An example of such a system is identity and access management (IAM), which requires a significant degree of transparency and verification to make sure it's running right.[12] On the opposite end are systems that are difficult or impossible to govern and audit. Engagement and advocacy automation, for example, can rely on monitoring systems outside those you own.

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## The People Effects Make Vividly Clear How Automation Affects Society

As you automate, you change humans' experiences. We can judge this in three ways: effects on human-machine interaction, broader social effects, and the impact of work as a whole. To be clear, these are fluid constructs that change with time. As technologies and processes mature, what doesn't affect people today could very much affect them tomorrow. In the people dimensions:

› **Human-machine interaction outlines whom (or what) the bots are talking to.** Not all automation has a direct connection with humans — some work directly with other types of automation through back-end channels. An example of automation with little to no human interaction is streaming analytics, software that analyzes incoming data in real time. This typically happens between systems, and the humans get the results afterward. An example of a system with a high degree of human-machine interaction is customer journey analytics visioning. This can't function without human input.

› **The human effect goes into the overarching social impact.** Automation, in general, has a wide social impact — it affects just about everyone, from the products we buy to the services we use. However, particular types of automation have a broader effect than others. An example of automation with a minimal human impact is container orchestration. While humans use the end product, the automation itself doesn't have a direct impact on them. Retail and warehouse robots have greater societal impact — these have the potential to augment or actually replace human employment.

› **Conversational intelligence judges human intent.** Many types of automation are, by design, simple: they perform a set series of tasks, driven by scheduler or a simple event system. A new class of automation leverages conversational intelligence to judge the human's intended outcome before the request is executed. For example, certain chatbots can apply text analytics to agent-assisted interactions to help judge the customers' true intent.[13] Over time, we expect to see AI-driven approaches to intent learning, resulting in a dynamic improvement in conversational efficiency.

## Visualize The Dimensions Collectively As A Graphic Equalizer

When we put together these dimensions, we can begin to compare different types of automation. Our model for this resembles a graphic equalizer on a stereo: Each scale can be somewhere between high and low. It's important to note that high in the scale doesn't mean "good" and low doesn't mean "bad" — it simply indicates where the technology falls on the dimension's spectrum. Two examples illustrate how you can visualize the differences:

› **Configuration management skews simple, with minimal societal impact.** Configuration management processes are relatively mechanical, requiring coded, structured data processed with a high degree of determinism (see Figure 3). From an enterprise perspective, the technology requires a relatively low RQ to operate and is transparent to audit. Configuration management doesn't understand intent — it relies entirely on the human to enable this through code. The human impact is minor. Most of the action is on the back end, the social impact is narrow, and the role of the work is largely centralized.

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› **Chatbots are more variable, both in their design and impact.** The technology takes in largely unstructured data (e.g., humans talking) and applies a mix of coded/deterministic and learning/ nondeterministic behaviors to process it (see Figure 4). The enterprise perspective requires a low degree of RQ to engage with it. Conversational intent can vary, with some solutions having robust algorithms and others having minimal capabilities. Finally, the people effect is obvious, with a high degree of human-machine interaction required and a moderate effect on society (many organizations now offer chatbots as an alternative to calling for support).

FIGURE 3 Configuration Management Is A Mechanical Process With Minimal People Impact



Example: configuration management
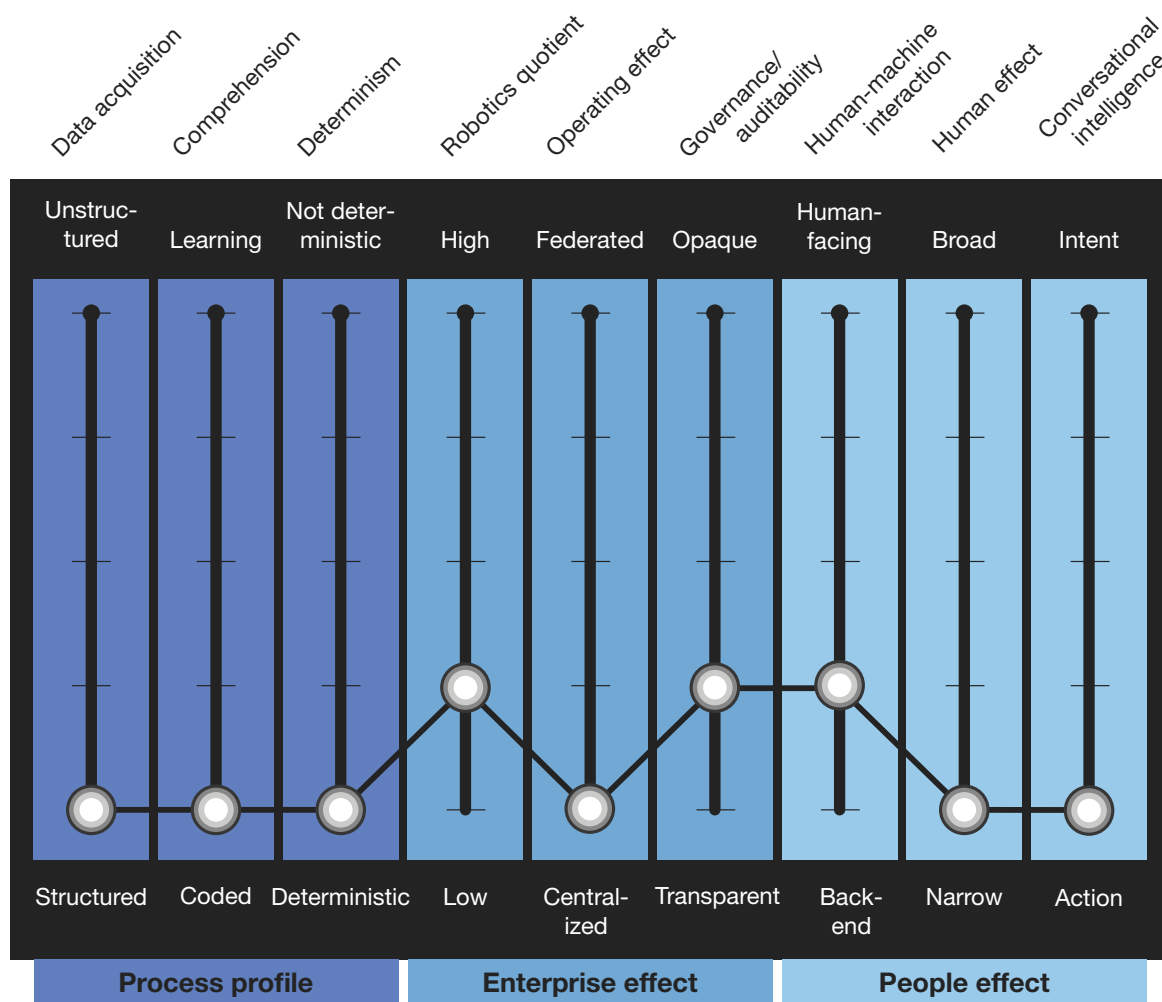
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**FIGURE 4** Chatbots Take In Unstructured Data And Have A Significant Effect On The Humans Interacting With Them



**Example: chatbots**

| Data acquisition | Comprehension | Determinism | Robotics quotient | Operating effect | Governance/ auditability | Human-machine interaction | Human effect | Conversational intelligence |
|---|---|---|---|---|---|---|---|---|
| Unstructured | Learning | Not deterministic | High | High | Opaque | Human-facing | Broad | Distributed |
| Structured | Coded | Deterministic | Low | Low | Transparent | Back-end | Narrow | Individual |

| Process profile | Enterprise effect | People effect |
|---|---|---|

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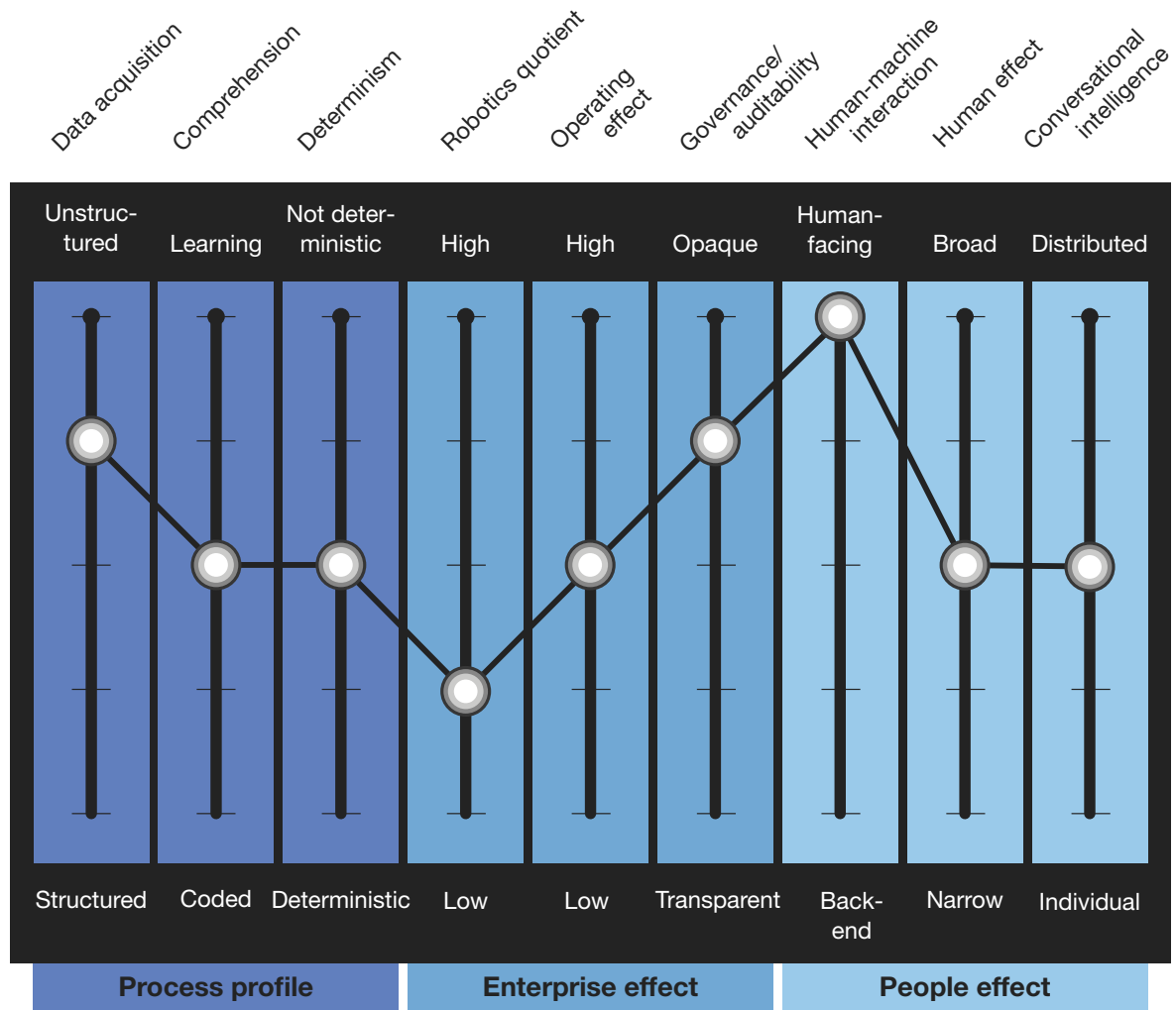Use Nine Critical Dimensions To Decipher The Automation Landscape

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## Filter The Hype, And Follow A Pragmatic Approach To Automation

People everywhere are buzzing about automation and AI. While commercial solutions are making a lot of genuine progress, hype sets unrealistic expectations. Knowing the fundamentals of a type of automation has value. Better-aligned shared services, streamlined APIs, and lower project risk can result. I&O professionals should use the model's five-point scale of nine dimensions to:

› **Align automation technology to what is truly necessary.** Dimensions offer a control point to match the right automation technology to the right use case. For example, deep learning's governance and audibility may be too opaque for your compliance process under review. Mature automation, like business intelligence, may meet governance requirements and deliver results more quickly, avoiding a protracted data science project.

› **Get better leverage over their portfolios.** Once you've selected technologies, evaluate them across the nine dimensions. You'll likely see technologies converge for comprehension, data acquisition, or robotics quotient (RQ), for example. This may indicate potential reuse of automation engines as well as the underlying machine learning or natural language processing (NLP) models.

› **Design modular and consumable automation services.** Our framework helps architects, engineers, and developers inventory automation by domain and isolate those they can modularize. This is important because automation technologies are inherently "fractal" in nature — you should package and reuse them through APIs over time. Automation must become services as capabilities grow more granular.

› **Estimate the effect of potential automation on process, enterprise, and people.** Some automation has little impact on process, enterprise, and people. On the other hand, advanced automation deployments often significantly alter culture, organization, and employee experience. Automation projects may require designing or redesigning a learning process, stress the available talent pool, or require a deep dive into unstructured content. Weave automation directly into your strategic operating model rather than grafting it on afterward.

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## Supplemental Material

**Online Resource**

Click the link in the download box at the beginning of this report on Forrester.com for an Excel tool containing more details about the dimensions of the automation framework.

## Endnotes

[1] More than half of companies are currently undergoing digital transformation efforts. See the Forrester report "Challenge Traditional Leadership To Win At Digital Transformation."

[2] For more on Forrester's predicted future of automation, see the Forrester report "Predictions 2019: Automation."

[3] Read about the state and maturity of RPA. See the Forrester report "Inquiry Spotlight: Forrester's RPA Inquiries Reveal Activity But Low Maturity."

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[4] To learn about the business opportunities presented by automation, see the Forrester report "The CIO's Guide To Automation, AI, And Robotics."

[5] Source: "The Total Economic Impact™ Of Red Hat Ansible Tower," Ansible, June 2018 (https://www.ansible.com/hubfs/pdfs/cm-forrester-total-economic-impact-ansible-analyst-paper-f13019-201806-en.pdf).

[6] Source: "Varta Uses VisionPro 3D to Ensure Production Speed and Product Quality," Cognex (https://www.cognex.com/applications/customer-stories/other-industries/varta-uses-visionpro-3d-to-ensure-production-speed-and-product-quality).

[7] For more on Forrester's predicted future of automation, see the Forrester report "Predictions 2019: Automation."

[8] Chatbots are only the beginning of conversational computing. See the Forrester report "Plan For Success In Conversational Computing."

[9] For highlights on the new class of software that automates insights-to-action cycles, see the Forrester report "The Dawn Of Digital Decisioning."

[10] For an explanation on why continuous delivery is now critical to any business, see the Forrester report "Nimble To The Core: Drive Continuous Delivery And DevOps At A Holistic Level."

[11] To understand how RQ relates to IQ and EQ for your employees, see the Forrester report "The Technology-Augmented Employee."

[12] For an overview of some of the coming innovations in IAM that are necessary to achieve trustworthy automation, see the Forrester report "The Future Of Identity And Access Management."

[13] Intent helps determine the unrestrained voice of the customer. For more information, see the Forrester report "Unlock The Hidden Value Of Chatbots For Your Customer Service Strategy."

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