



**How robotics and cognitive automation  
will transform the insurance industry**

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# Introduction to robotics and cognitive automation (R&CA)

The use of robots to drive tangible business benefits is very much a reality today. In fact, the IT-enabled robotic process automation (RPA) market has been growing rapidly at a CAGR of 60.5% from 2014 and is expected to reach US\$5 billion by 2020.<sup>1</sup>

RPA in a pure form, however, is just the beginning: Cognitive capabilities that enable machines to perform tasks normally reserved for human intelligence are now being leveraged with robotics as well. Cognitive technologies include such capabilities as machine learning, natural language processing (NLP), machine vision, emotion recognition, and optical character recognition, among others.

Each of these technologies builds on the existing competencies of RPA and advanced analytics, including neural networks, data mining, and Big Data processing. The resulting combination—termed robotics and cognitive automation (R&CA)—encompasses a potent mix of automated skills that finds application across industries. R&CA is expected to foster greater collaboration between humans and machine by both automating repetitive tasks and enhancing the quality of jobs. R&CA technology is now poised to unlock a world of possibilities through the synergistic combination of its key components.

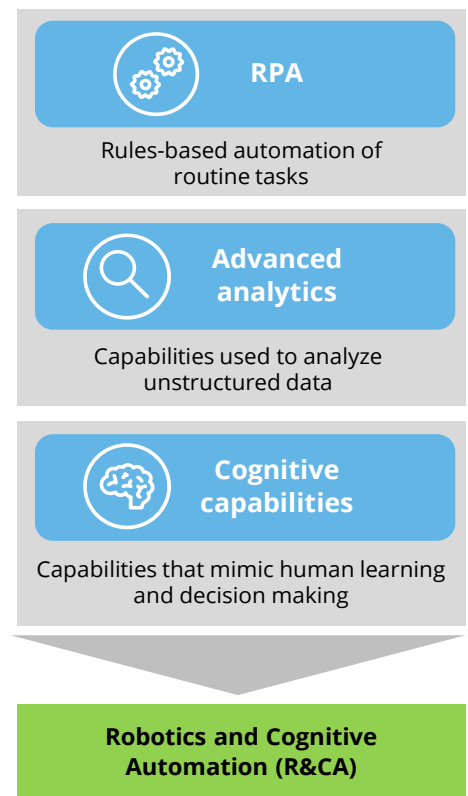
## Automation in the insurance industry

RPA technology is seeing widespread adoption across industries, including financial services broadly. However, the insurance sector has been lagging behind banking and other financial services domains in its adoption. Insurers have just started to run pilot programs to explore the benefits that RPA can provide in automating repetitive processes. Those that have made inroads are already experiencing positive results. The benefits of R&CA, however, go far beyond just efficiency gains. As figure 2 below outlines, the potential for R&CA across the insurance value chain is

significant. While RPA is expected to act as a first step in the adoption of automation, cognitive technologies are expected to increasingly drive automation for the sector in the not too distant future.

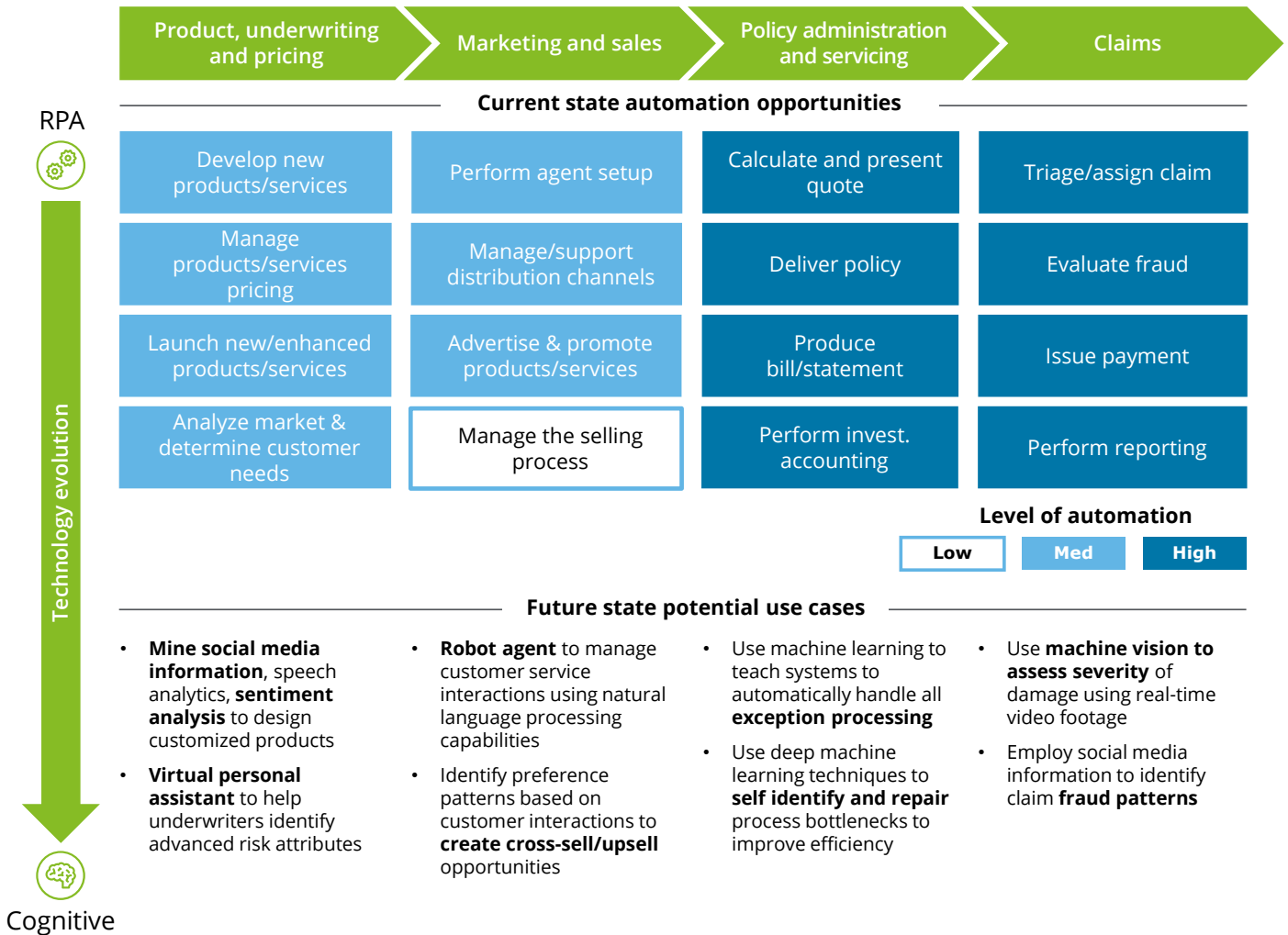
In light of this impending transformation, it is important that insurers understand the long-term business implications of R&CA beyond robotics alone. This white paper addresses how the insurance industry will need to reconfigure its operating model and adopt a more customer-centric approach in order to capitalize on the opportunities unlocked through cognitive automation.

Figure 1. Defining R&CA



Source: Deloitte analysis

Figure 2. Transformation of the insurance value chain by R&CA



Source: Deloitte analysis

# Operating model reconfiguration

While adoption of any new transformational technology warrants reconfiguration of the operating model, R&CA is likely to have the highest impact on the people and technology aspects.

## A. Impact to employment in the insurance industry

Over the next 10 years, automation is expected to displace 22.7 million existing jobs and create 13.6 million new jobs in the US economy, resulting in a net job loss of 9.1

million jobs (or 7 percent of jobs in the US). A significant portion of this impact would be felt across the insurance industry, given that 51 percent of financial jobs are projected to be transformed by automation by 2019.<sup>2</sup>

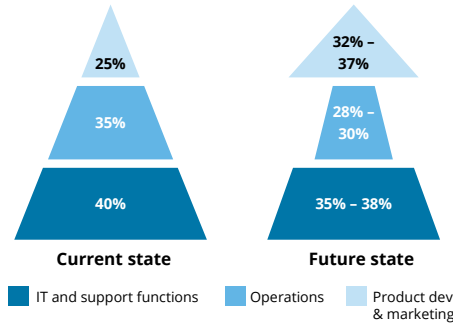
In most insurance firms, the current delivery pyramid is observed to be significantly bottom heavy with the majority of volume-heavy transactions and reporting processes (regulatory reporting, claims processing, document verification, etc.) being performed by humans. The advent of robotics will

likely reshape this pyramid as insurers automate many of these transactions/processes, potentially reducing the size and engagement of the bottom and middle layers of the delivery pyramid, while seeing a growth in the top layer.

**Business development, product, and marketing in response** would see a growth in jobs due to a demand for skills in areas such as data analytics, machine learning, and development of algorithms.

These skills would better enable insurers to build new insurance products using dynamic pricing strategies based on lifestyle pattern intelligence and recognition, while running focused and customized marketing campaigns.

**Figure 3. Insurance employment pyramid**



Source: Deloitte analysis

**Operations**, including policy servicing and reporting, would see ever-greater levels of self-service and automation, as well as completely new, highly streamlined digital processes. With requests to back offices dropping significantly, these services will likely see the steepest FTE shift/migration. In the claims area, R&CA is expected to create new roles that would leverage such technologies as machine vision and optical character recognition to assist humans in adjudicating complex cases.

**IT and other support functions** would see decreases in FTEs due to reduced overhead as a result of standardized and automated processes and the potential migration to new strategic data platforms on cloud and other third-party analytical tools.

These shifts might, however, also lead to the creation of more fulfilling jobs in the transformed insurance landscape. For example, it is a likely scenario that knowledge workers will have access to personal cognitive assistants to enable

data-intensive jobs and also aid in decision making. This phenomenon, which is widely termed “bring your own robot,” will likely make employees more productive and efficient, thereby allowing them to focus on innovations to help serve customers better.

As FTEs will be required to deliver more value-added services/processes, insurance firms have to be cognizant of the following key implications for their service delivery model:

- **Skill matrix:** Insurance firms will need to upskill the different layers of the FTE pyramid in order to re-deploy resources into more complex, judgement-intensive roles. And underwriters of the future will need to be equipped with tools that work with inputs provided by a cognitive system that takes into consideration multiple complex variables about risk from non-traditional sources such as social media.

**Figure 4. FTE impact of R&CA on insurance functions**

		Short-term impact: RPA (1-5 years)	Long-term impact: R&CA (5-10 years)
Product and underwriting	Marketing	🟡 Digital marketing, campaign management	🟢 Customer segmentation, focused and customized marketing
	Product development	🟡 Digital products	🟡 Customized products based on individual preferences
	Underwriting/actuaries	🟢 N/a	🟡 Customer segmentation, focused and customized marketing
New business development	Sales support	🟡 Channel management	🟢 Channel management through advanced analytics
	Customer management	🟡 Automated complaints and issue management	🟢 Lifestyle pattern intelligence
	New customer acquisition	🟡 Automated customer onboarding	🟡 Targeted customer acquisition
Policy processing	Policy issuance	🟡 Business rules administration	🟡 Cognitive analytics enabled self-correcting processes
	Policy servicing	🟡 Business rules administration	🟡 Cognitive analytics enabled self-correcting processes
	Regulatory and business reporting	🟡 Automation of rules-based reporting capabilities	🟡 Intelligent reporting and analysis capabilities
Claims	Claims management	🟡 Standard claims management processing	🟡 Advanced processing enabled by image recognition
	Claims adjustment	🟡 Automated processes	🟡 Machine vision to assess simple claims
IT	Application development and maintenance	🟡 Increased reliance on third-party service providers	🟡 Standardized processes and applications
	Infrastructure	🟡 Increased reliance on open source technologies	🟡 Migration to cloud
Support functions	Human resources	🟡 Standardized HR processes, digital recruitment	🟡 Standardized HR processes, digital recruitment
	Finance, tax, and planning	🟡 Standardized reporting	🟢 Reduced overheads
	Other support functions	🟡 Reduced overheads	🟢 Reduced overheads

Source: Deloitte analysis

🟢 Increase in FTEs    🟡 Decrease in FTEs



- Managing talent:** Recruitment and training engines will have to be upgraded to hire and train skilled FTEs with stronger domain competencies to handle more complex decision-making roles. Along with the demand for such technical capabilities as machine learning and NLP, soft skills such as creativity, flexibility, reasoning, and empathy are also likely to be key for talent leaders managing this organizational change. A shift toward a highly skilled workforce would also lead to a need for enhanced talent retention.

As jobs are transformed at all levels across the insurance value chain, it must be understood that the technology will not replace talent as a sustainable competitive advantage. New jobs with completely renewed job descriptions will be created as a result of this large-scale transformation. Firms that strike a balance between transitioning to R&CA on one hand and making required FTE adjustments and upskilling their existing workforce on the other will likely stand to gain the most.

**B. Technological transformation**

Insurers should prepare themselves for the imminent R&CA transformation by reconfiguring their IT systems. The transformation will be an extension of the journey that has first begun in such areas as RPA and advanced analytics enablement. The industry will witness the following technology landscape changes on the journey toward R&CA adoption:

- Modular sourcing:** The R&CA technology industry is now engaged in an “disaggregation” phase in which nimble firms that provide specialized technological capabilities are well positioned to disrupt the incumbents. These vendors are already providing disaggregated services on the cloud. For example, one leading ecosystem player provides a series of modular services such as “personality insights,” “visual recognition,” “text analytics,” etc. Through this approach, insurers can source different capabilities from niche vendors (provided that their underlying IT architectures are flexible enough to tap into these cloud-based services)

and use these capabilities as “cognitive operating systems” in building intelligent applications.

- Integrated systems:** R&CA technology has the inherent capability to iteratively self-learn and generate insights through access to data from multiple sources. In order to maximize the returns from this technology, integration with legacy systems and other emerging technologies such as Big Data, IoT, cloud, etc., must be achieved. This will likely lead to a much-desired breakdown of walls between silos of data across the enterprise, thereby enabling the establishment of a single source of truth and delivery of a unified data model in a significantly more consumable form.

- Transparency and control:** Cognitive systems will undoubtedly partner with humans in the near future. To gain trust in the robots with whom they are working, humans will need to understand how a particular decision has been arrived at. Given the nascent stage of R&CA technological development, humans are expected to have the ability to overturn machine-made decisions. Furthermore, regulators are likely to insist on robust audit mechanisms. The R&CA systems of the future will have to be designed keeping in view all these transparency and control features.

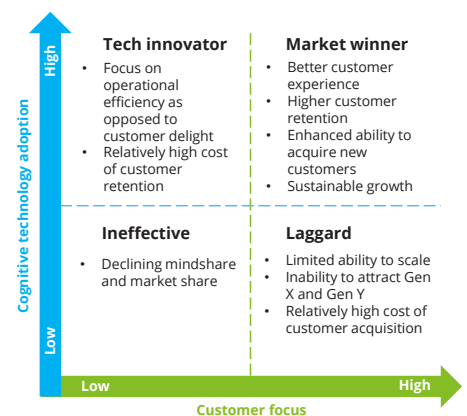
The technological landscape is evolving quickly, and the implication for insurers is the need to identify and source relevant capabilities to allow for better task design and an appropriate division of labor between humans and machines.

# Focus on customer centricity

With the demographics of insurance customers seeing an influx of Millennials,

Gen Xers, and Gen Yers, customer interaction preferences are changing. According to one survey, approximately 41 percent of respondents have left an insurer because of poor customer experience.<sup>3</sup> In another survey, 27 percent of the Gen Yers and 23 percent of Gen Xers who were questioned indicated that they want to interact with their insurer through digital self-service.<sup>4</sup> Customer expectations for convenience through consistent information and service levels across multiple channels or touch points is likely to drive insurers to mirror non-insurance industry experiences, such as online retail, banking, etc.

**Figure 5. Customer focus vs. cognitive technology adoption**



Source: Deloitte analysis

Insurers have already started to employ advanced analytics to gain deeper customer insights. However, the volume, unstructured nature, and velocity of data being generated is beyond the realm of traditional analytic processes. The benefit of cognitive computing is that it can solve problems that traditional analytics cannot readily address. R&CA will help empower insurers with the ability to provide an improved customer experience and more personalized offerings.

**A. Improved customer experience**

Using social data, interactions can be personalized to understand customer needs better. Through solutions that understand natural language, learn and build knowledge, and communicate seamlessly with customers, organizations can provide better customer experiences.

Robots equipped with language processing capability could replace human interaction with customers in areas such as First Notice of Loss (FNOL) and customer support. Using machine learning techniques, these robots will be able to iteratively improve their understanding of customer queries and grievances. With advances in emotion recognition and sensing technology, the robots will also be able to analyze patterns in customer behavior. Insights gained from these can be used to provide a unique, personalized customer experience. Without emotional wear and tear or natural human fatigue, robots can be used to achieve scale in quick time, increasing the scope of this technology to a wide base of customers. This capability can help the insurer to curate and control the customer experience, while letting employees focus on more complex tasks.

“What are my expenses other than Home Loan EMI, for the past three months?” A question that could be answered by a robot in English without human intervention.

Machine vision is an evolving technology that is touted to emulate human vision. It has found application in the automotive industry in such areas as robotic guidance and quality control, and can be extended to the assessment of claims. Customers could potentially send pictures from an accident site and the robot positioned at the other end would assess the extent of damage. While this feature may not be immediately extended to complex claims cases, it certainly is expected to reduce the handling time for simple claims.

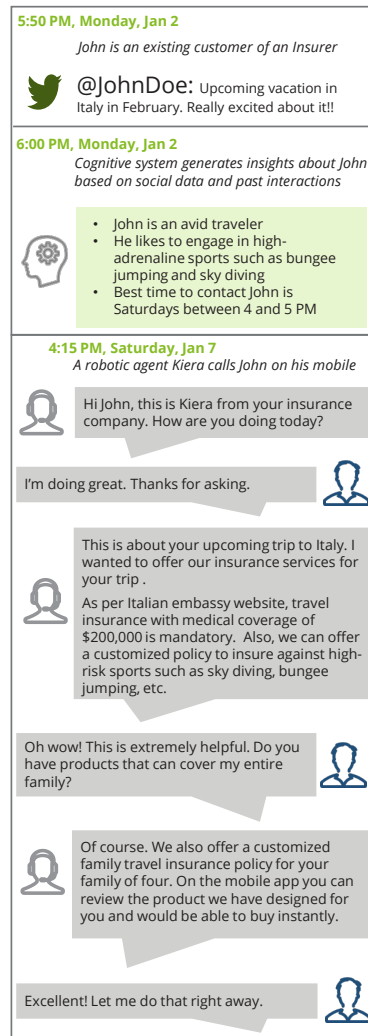
Time-consuming activities such as fraud detection can be eased by employing entity analysis techniques using machine learning along with advanced analytics. At the time of onboarding, the technology can help bridge the gap between who customers really are and who they claim to be.

## B. Increased personalization

Another priority for a customer-focused approach is to make insurance offerings more personalized across customer touch-points.

- **Personalized products:** Historically, the process of rendering underwriting decisions on a case-by-case basis to account for individual applicant risk

**Figure 6. A potential customer interaction using robot agent**



Source: Deloitte analysis

factors has not been particularly helpful in driving increased product personalization. R&CA technology addresses this challenge by enabling insurers to mine data from a wider range of sources than have been traditionally used, such as connected devices and social media. Additionally,

automation capabilities provided by this technology can enable insurers to virtualize the underwriting process to a large extent, thereby facilitating their ability to scale up to a wider customer base. With such advancements at hand, the industry is expected to move away from the practice of “finding customers for products” to a model in which needs and risks of customers are understood and considered at a much more granular level.

- **Personalized advice:** The role of agents is diminishing as increasing disintermediation in insurance distribution continues to create an “advice gap.” Taking cues from the investment management industry, robots are being designed now to act as trusted risk advisors to insurance customers.

To that end, insurance robo advisor Clark, for example, recently completed “Series A” funding of approximately 13 Million Euros.<sup>5</sup> Clark uses algorithms to first analyze its customers’ needs and then automatically propose optimization opportunities.

- **Personalized marketing and distribution:** Leading insurance companies are already utilizing analytical engines to generate a unified profile view of their consumers as a means of intelligently aiding agents on their customer calls. Take the same example in figure 6 above in which John Doe reaches out to an agent to understand available home insurance solutions. During the conversation, the smart assistant can provide the agent insights about John’s upcoming trip to Italy. It can also customize the coverage at different price points to suit John’s personal needs. An agent armed with an electronic smart assistant is sure to have more enriching conversations with customers.

As discussed above, R&CA technology can act as a key enabler for customer centricity. Leveraging the plethora of capabilities offered by such tools, insurers can now design customer journeys from scratch rather than simply replicate existing journeys that are, at best, yesterday’s stories with merely a bit more processing efficiency.



# R&CA guiding principles

Based on the ability of R&CA to both uniquely leverage ever-increasing volumes and varieties of data and drive new paradigms in processing efficiency, there is little doubt that this technology has significant relevance for the insurance market. The question is how should the industry approach an R&CA-driven transformation across its value chain? The model depicted in figure 7 provides an indicative framework for insurance leaders to plan and implement pilot programs as part of their efforts to galvanize their respective cognitive journeys.

The core foundation of R&CA technology is guided by four broad principles:

- Cognitive systems need to **synthesize** vast amounts of data to generate powerful insights and connections
- Robotics capabilities play a dominant role in **performing** actions that would otherwise be driven by humans, the results of which produce insights that help generate and validate hypotheses to aid in decision making
- Cognitive systems **interact** with customers and employees using natural language and demonstrate contextual reasoning
- Given their probabilistic nature, cognitive systems need to continuously **learn** from their past actions and evolve more accurate algorithms

With a firmly established core foundation, insurers can adopt a measured approach to achieve their desired R&CA goals:

- **Develop strategy:** To establish an effective strategy, consideration should be given to business outcomes that align with key strategic objectives, such as improved customer experiences, better underwriting capabilities, enhanced fraud detection, and smoother claims processing, among others. Insurers will also need to evaluate the business case

for investing in R&CA technology to enable target benefits in such focus areas.

- **Align stakeholders:** Once clarity of desired business outcomes is established, attention should shift to aligning stakeholders with the target state vision. A sponsorship structure will be key to drive the program forward.
- **Identify opportunities:** Identified business outcomes then need to be mapped to specific business problems for application of cognitive technology. A “Three Vs” framework<sup>6</sup> as described below can enable the delivery of such lineage:

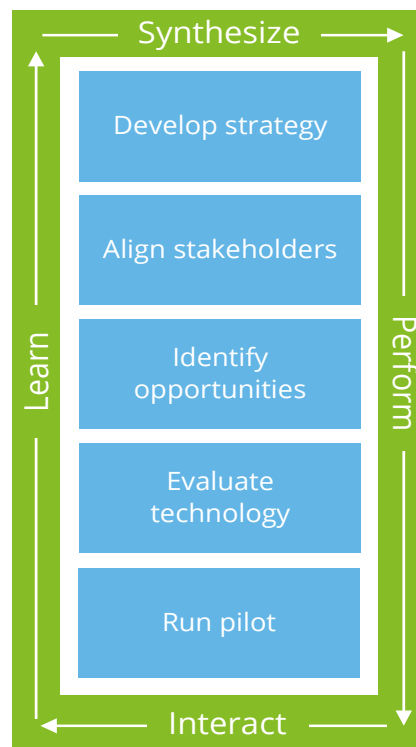
that require a low or moderate level of skill along with capabilities such as human perception, speech recognition, or vision represent good pilot opportunities. Application areas for insurers could include forms processing, simple rules-based underwriting, and similar functions.

- b. **V2 – “Valuable”:** Recognizing that everything viable is not necessarily valuable, insurers will next want to identify those opportunities where expertise is scarce and the impact of improved performance is high. Application areas here may include loss assessment and claims processing.
- c. **V3 – “Vital”:** For certain business problems that cannot easily scale because they demand a level of human expertise, cognitive technology provides a vital alternative to influence desired business outcomes. Application areas here may include fraud detection and sentiment analysis in customer interactions.

- **Evaluate technology:** The next step requires IT leaders to assess current technological capability and identify tools and partnerships that are needed to enable desired business outcomes.
- **Run a series of pilots:** Finally, program sponsors should identify metrics-driven pilot programs to stress test solutions driven by R&CA technology to ensure that the technology implemented is delivering business value as planned.

Since R&CA technology is still an evolving science, there are no industry-leading practices yet around its implementation. A careful assessment of needs coupled with targeted pilot programs would allow insurers to test the waters in small modules and subsequently capitalize on the advantage of these learnings while embarking on a full-blown implementation effort.

Figure 7. R&CA guiding principles



Source: IBM, Deloitte analysis

- a. **V1 – “Viable”:** Use cases that are relevant and viable must first be identified and understood. Tasks

# Conclusion

Insurance companies are often perceived as being conservative in their approach and slower to embrace changes. Unfortunately, such inertia is no longer a viable option. Simply put, insurers who fail to embrace the cognitive journey will likely cede important strategic advantage to competitors and new market entrants already riding the wave.

Conversely, organizations that try to do too much too soon in pursuit of first mover advantage in the R&CA space may also be at risk. Running a manageable set of pilot programs at the outset of the journey to test cognitive automation capabilities is a more sound strategy. This approach can enable the insurer to align business outcomes with the expectations and facilitate a smoother implementation downstream. Once pilot results prove out, a longer-term strategy

can be leveraged to define how cognitive automation should be blended into the fabric of the organization.

Finally, it is always interesting to watch how the external environment responds to the advances in technology. Given the highly regulated nature of the insurance industry, we can expect these watchers to bring cognitive technology into greater focus in an effort to assure that interests of the consumer are not being compromised through the deployment of such tools. Undoubtedly, the extent to which personal information can be used in R&CA-enabled environments to customize customer interactions and experiences without breaching rules of privacy may become a bone of contention for regulators.

In short, these are very interesting times for the insurance industry. Organizations that define an optimal and successful operating model and design a strategy centered on leveraging new enabling technologies to meet the needs of today's insurance consumer are likely to be most successful.

“The horse is here to stay, but the automobile is only a novelty, a fad”  
-President, Michigan Savings Bank, 1903

# Appendix

## Glossary

Technology	Description
<b>Machine learning</b>	The ability of computer systems to improve their performance by exposure to data without the need to follow explicitly programmed instructions.
<b>Data mining</b>	The process of discovering meaningful correlations, patterns, and trends by sifting through large amounts of data stored in repositories by leveraging statistical and mathematical techniques.
<b>Natural language processing</b>	Ability of computers to work with text the way humans do; for instance, extracting meaning from text or even generating text that is readable, stylistically natural, and grammatically correct.
<b>Cognitive reasoning</b>	Emulating human reasoning typically by learning, coming to conclusions, appearing to understand complex content, engaging in natural dialogs with people.
<b>Voice recognition</b>	Automatically and accurately transcribing human speech by interpreting the voice and translating it into text or commands.
<b>Integration adapters</b>	Integration adapters provide a critical foundation for any system with a unified connectivity architecture, facilitating integration of information from several on-premise, legacy, and cloud-based applications and systems.
<b>Optical character recognition</b>	Using pattern matching to convert handwritten letters into corresponding computer text or commands in real time.
<b>Emotion recognition</b>	The task of recognizing a person's emotional state by analyzing the characteristics of the voice signal, with word use as an additional input, if available.
<b>Recommendation engine</b>	The framework that provides insights/recommendations from an integrated view of all data components and combining analytics capabilities.

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