

ENABLING SERVICE EXCELLENCE

THROUGH
SERVICENOW'S®
AGENT INTELLIGENCE



THE MACHINE LEARNING OPPORTUNITY

Intelligent automation is one of today's most exciting technology trends. It's a trend that takes many forms. Whether it's seen in natural language processing, machine learning, 'bots', knowledge representation or other forms of artificial intelligence, it's all aiming at a common goal: to amplify the potential of people to get work done intelligently. And it's becoming a very big deal. Indeed, intelligent automation was identified by Accenture's 2016 Technology Vision report as one of the essential technology trends for business success in the digital economy.¹

As the trend has taken hold around the world, the underlying technologies like machine learning have also been evolving. Although machine learning algorithms have been in use in one form or another for a long time, they have undergone something of a revolution in recent years. They now have the ability to automatically apply complex mathematical calculations and pattern recognition to big data with vastly improved speed and accuracy. And high-performing organizations are already harnessing machine learning capabilities to transform the way their employees work and create new categories of jobs. In the process, those organizations are rethinking what they do across every area of the enterprise – from business processes right through to customer experiences.

Front-line customer support is a particularly promising area. And leading enterprises are already pinpointing how to make the most of intelligent automation in support of their customers. We know, for example, that machine learning techniques based on pattern recognition work best with targeted use cases that leverage lots of rich contextual data. This suggests that organizations using integrated platforms for end-to-end service management are likely to benefit most from the technology. That's because data and information often flow through different functions of a service organization required to provide customer support. And this data, along with the machine learning applied to it, is what enables an enterprise to evolve from the traditional break-fix model to a more customer-centric and cost-predictive service model. Simply put, machine

learning enhances productivity and augments the way people do their work. And the resulting impacts, from reducing service costs to improving customer experience, are huge.

This report describes the potential of machine learning in front-line customer support functions. It does so by looking at ServiceNow – the industry-recognized leader in integrated platforms to support enterprise service management – and its new supervised machine learning capability. ServiceNow Agent Intelligence harnesses machine learning and pattern recognition to automate the work of service desk respondents, bringing new levels of speed and efficiency to service organizations.

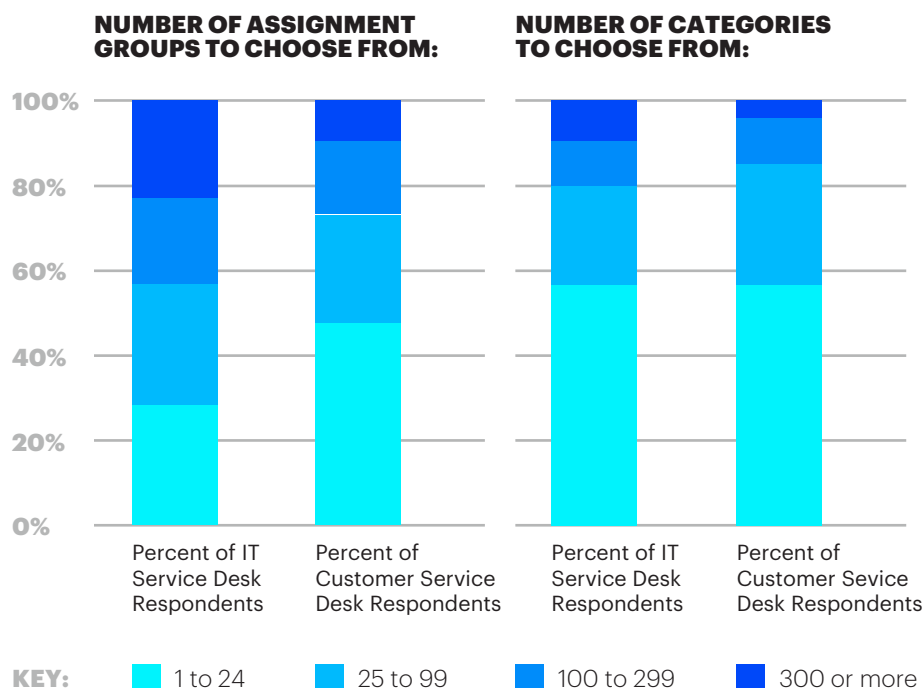
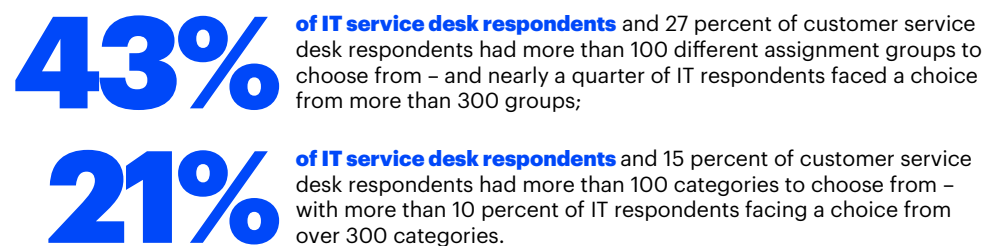
In producing this report, we have quantified the opportunity and assessed the effectiveness of ServiceNow's Agent Intelligence. To do so, we modeled a scenario for a typical front-line customer support function. We used accuracy and coverage results from ServiceNow's customer pilot program, together with some conservative assumptions, to assess the impact. The result: an impressive ROI of **42 percent**, with benefits exceeding **\$100,000** over three years and a payback period of just **10 months**. In addition, the pilot program also demonstrated that the average customer can expect an estimated time savings of approximately **8 percent** (or more than **26,500 hours** per year).

THE OPPORTUNITY: CREATING BETTER CUSTOMER EXPERIENCES – AT A LOWER COST

In any typical front-line customer support function, customers use many different channels – telephone, web-chat, email, a service catalog – to raise issues, ask questions and make requests. Although machine learning solutions are increasingly being used behind the scenes for some of these channels (in web-chats and emails for example), this remains for the most part a human-intensive process. So, when a customer makes contact, the resulting unit of work is usually converted to an electronic record (often called a ‘ticket’) and employees, whether service desk agents or customer service agents, are tasked with first triaging and then managing these tickets through to closure. Ideally, they do so quickly, effectively, and without requiring the help of more expensive resources.

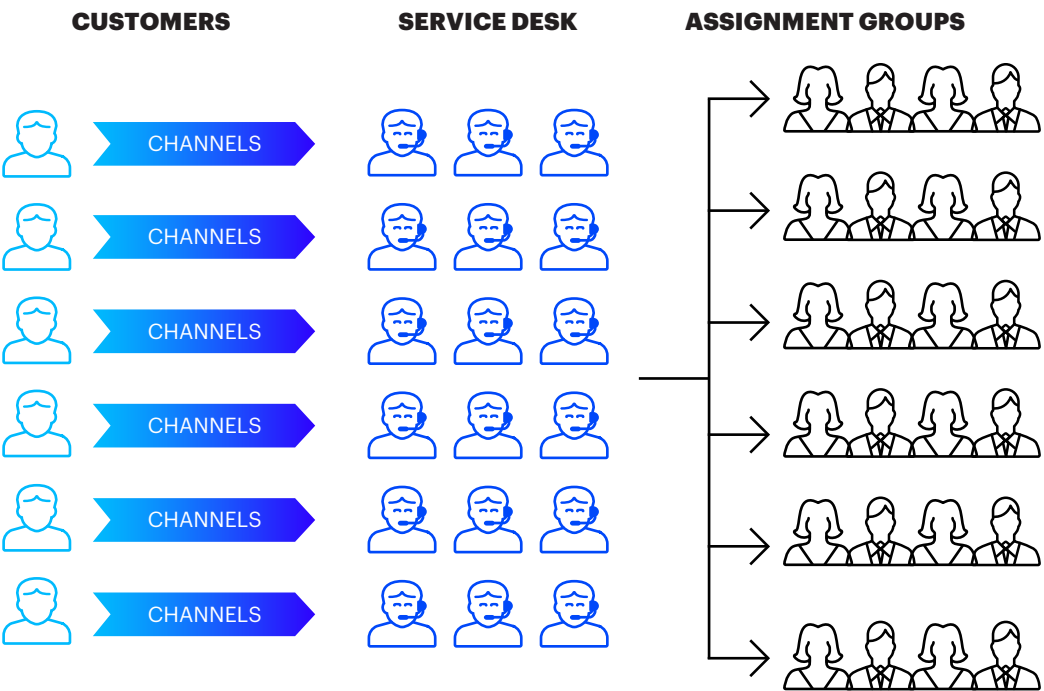
Inevitably, some tickets can’t be resolved by the agent on their own and require additional help. This is where the agent must decide where to route or assign the ticket. Sometimes this is a relatively simple decision, but many service organizations have complex delivery ecosystems, with large numbers of assignment groups. The decision is therefore not always straightforward.

TO ILLUSTRATE THIS, RECENT RESEARCH HIGHLIGHTS THE POTENTIAL SCALE OF THE PROBLEM.² IT FOUND THAT:



Any organization in which front-line customer support staff are spending a lot of time making decisions about ticket categorization, prioritization and assignment is incurring excessive costs and negatively impacting the customer experience. Indeed, recent research indicates that front-line customer support functions spend approximately **12 percent** of their time categorizing, prioritizing and assigning tickets.³ It's therefore easy to see opportunities for improvement – and where machine learning could help.

Machine learning techniques based on pattern recognition work best with targeted use cases that leverage lots of rich contextual data. This means that service organizations that use integrated platforms, such as ServiceNow, for end-to-end service management are likely to benefit most from the technology. That's because data and information often flow through – and are enriched by – the different functions of a service organization required to provide end-to-end customer support.



THE SPEED AND ACCURACY OF TICKET CATEGORIZATION, PRIORITIZATION AND ASSIGNMENT ARE CRITICAL CONTRIBUTORS TO BOTH CUSTOMER EXPERIENCE AND SERVICE COSTS

The challenge for front-line customer support staff is that they are unable to see meaningful patterns within these huge volumes of data. It is often difficult for them to determine the right category, priority and assignment group for a specific ticket, even if it's a repeatable task like a server reboot. The individual customer context is vital. Understanding this context often takes time and is complicated by the fact that every individual will approach the question in their own way, based on their particular skills, experience, institutional knowledge and time pressures.

This is where machine learning is extremely powerful. In many cases, the context of a particular ticket is already represented in data that exists within an integrated service management platform. Machine learning can effectively leverage these huge volumes of data to automate work based on the collective experience and wisdom of the whole system, rather than any one individual. Models can thus be generated to predict the output based on a given input and fine-tuned by humans to improve accuracy, coverage and error handling. Machine learning is ideal in such cases since it is as efficient at processing **10 tickets** as it is at processing **10,000 tickets**.

NEARLY A QUARTER OF IT SERVICE DESK RESPONDENTS NEED TO CHOOSE FROM OVER 300 DIFFERENT ASSIGNMENT GROUPS

**THUS, WHEN MACHINE LEARNING IS APPLIED TO THE CATEGORIZING,
PRIORITIZING AND ASSIGNING OF TICKETS, A SERVICE ORGANIZATION CAN
DERIVE THE FOLLOWING BENEFITS:**

1

**INCREASED
PRODUCTIVITY:**
rapid ticket creation
and routing

2

**INCREASED
PRODUCTIVITY:**
less time wasted
on incorrect
ticket routing

3

**IMPROVED
CUSTOMER
EXPERIENCE:**
a faster, more
accurate process

4

**INCREASED SLA
COMPLIANCE:**
a faster, more
accurate process

5

**BETTER
EMPLOYEE
ENGAGEMENT:**
reduce time spent on
mundane tasks

6

**INCREASED
PRODUCTIVITY:**
less time on service
desk agent training

7

**IMPROVED
QUALITY:**
fewer service
outages.

The next section of this report focuses on quantifying the first four of these benefits, although we recognize that additional 'softer' benefits can also be used to enhance a business case.

THE BUSINESS IMPACT OF SERVICENOW'S AGENT INTELLIGENCE

In the second quarter of 2017, ServiceNow announced it would be incorporating intelligent automation capabilities to tackle some of the biggest problems faced by modern service organizations. Their Intelligent Automation Engine⁴ aims to eliminate outdated processes by automating more tasks and decisions, helping organizations transform how they work through greater enterprise velocity.

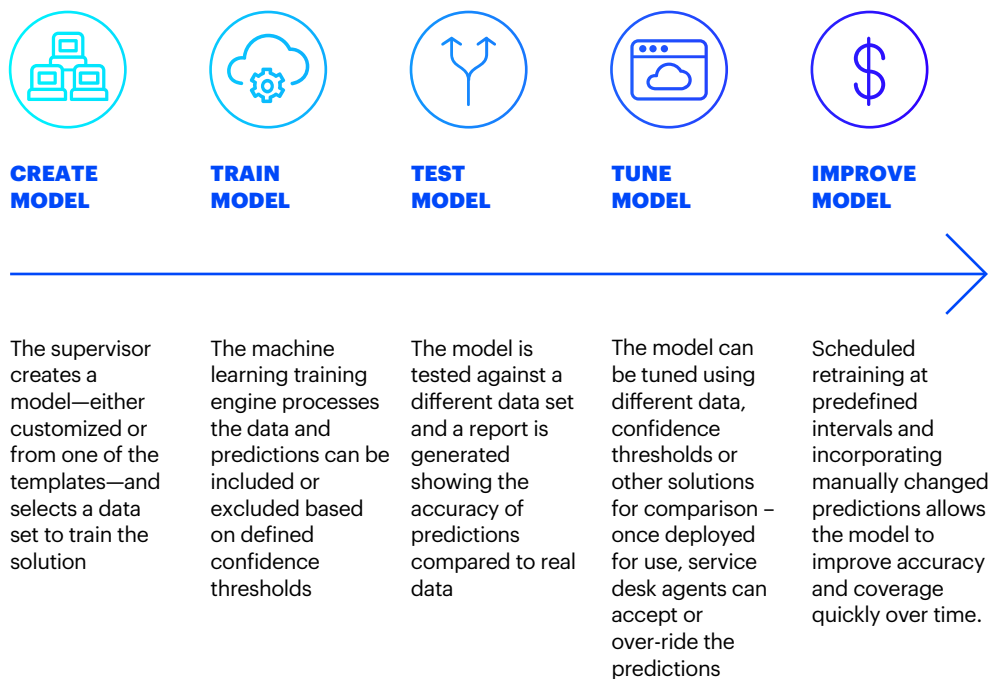
Agent Intelligence, a component of the ServiceNow Intelligent Automation Engine, uses supervised machine learning technology to create and train solutions that leverage a customer's historical ServiceNow data. These solutions are then used to predict a ticket's field values (for incident records, case management records, etc). In doing so, they're helping organizations unlock the value inherent in their unique data sets. And by learning from past patterns, Agent Intelligence can automatically determine the category, priority and assignment group for a ticket based on the description text entered into the ticket.

These trained solutions are bringing new levels of speed and efficiency to service organizations today. What's more, they offer an essential foundation for the future – one in which workloads are likely to increase by several orders of magnitude when, to take just one example, service organizations must operate in a world of countless connected devices.

HOW DOES AGENT INTELLIGENCE WORK?

Agent Intelligence uses machine learning techniques based on pattern recognition. It therefore uses large volumes of data to create models with a strong correlation between the text found in *input* and *output* data.

Agent Intelligence provides the machine trainer (or supervisor) with a simple template from which to select input and output data where they believe strong correlations exist. It offers predefined templates for predicting ticket categorization, prioritization and assignment based on the text used to describe the customer interaction. These templates can be applied to both incident records (IT service management) and case management records (customer service management). In addition, the supervisor can create new models using any input and output data from any ServiceNow table.



**THE SUPERVISOR THEN SELECTS A
UNIQUE SET OF HISTORICAL
RECORDS – TYPICALLY BETWEEN
15,000 AND 30,000
– FROM WITHIN THE SERVICENOW
PLATFORM AND STARTS THE
TRAINING PROCESS.**

The machine learning training engine processes the data and returns the results. By setting a confidence threshold, the supervisor can tune the model so that it only includes input/output relationships where there is a confidence level of, say, 80 percent. As part of this training process, some of the data is set aside and used to test the model.

Once the model has been trained, a report is generated to provide an accuracy estimate using the data set aside for testing the model. The supervisor can run the model against a similar or different set of data with different confidence levels, and compare the predictions from one model to another. In addition, the model can be enhanced to incorporate other rich contextual data that exists in ServiceNow. This could include customer locations, customer segments, customer importance, customer preferences or the most frequently found solutions.

When the test results are deemed satisfactory, the model can be activated for use in production. As service desk agents then create and update tickets to reflect their interactions with customers, the model will use the text in a ticket's *description* field, as well as other rich contextual data, to suggest an appropriate category, priority and assignment group for any ticket that needs to be routed elsewhere.

Each ticket for which the model's prediction matches the actual result is considered a 'success'. Any mismatch (in other words, any prediction that was subsequently changed by the desk agent) is considered an 'error'. These errors are then used in the scheduled retraining of the model, which takes place at customer-defined intervals.

Over time, the model can be refined by the supervisor to increase both the accuracy and the coverage (that is, the types of scenarios it can accurately predict).

WHAT'S THE **BUSINESS VALUE** OF AGENT INTELLIGENCE?

To quantify the benefits associated with Agent Intelligence, ServiceNow conducted a four-week customer pilot program.

More than **90,000 records** were processed during the pilot to generate machine learning solution models. The results achieved by these models were extremely positive – they recorded an average accuracy of **71 percent** and an average coverage of **67 percent**.

PILOT CUSTOMER	SERVICENOW AGENT INTELLIGENCE		ESTIMATED NUMBER OF TICKETS PER MONTH	ESTIMATED NUMBER OF SERVICE DESK AGENTS
	OVERALL ACCURACY	OVERALL COVERAGE		
A	82%	76%	40,000	300
B	76%	73%	14,000	28
C	65%	87%	10,200	400
D	81%	53%	-	70
E	65%	62%	20,000	50
F	58%	49%	-	-
Average	71%	67%		

“**WITH SERVICENOW AGENT INTELLIGENCE WE WOULD HAVE HAD A 97-99% (INCIDENT ASSIGNMENT) ACCURACY.**”

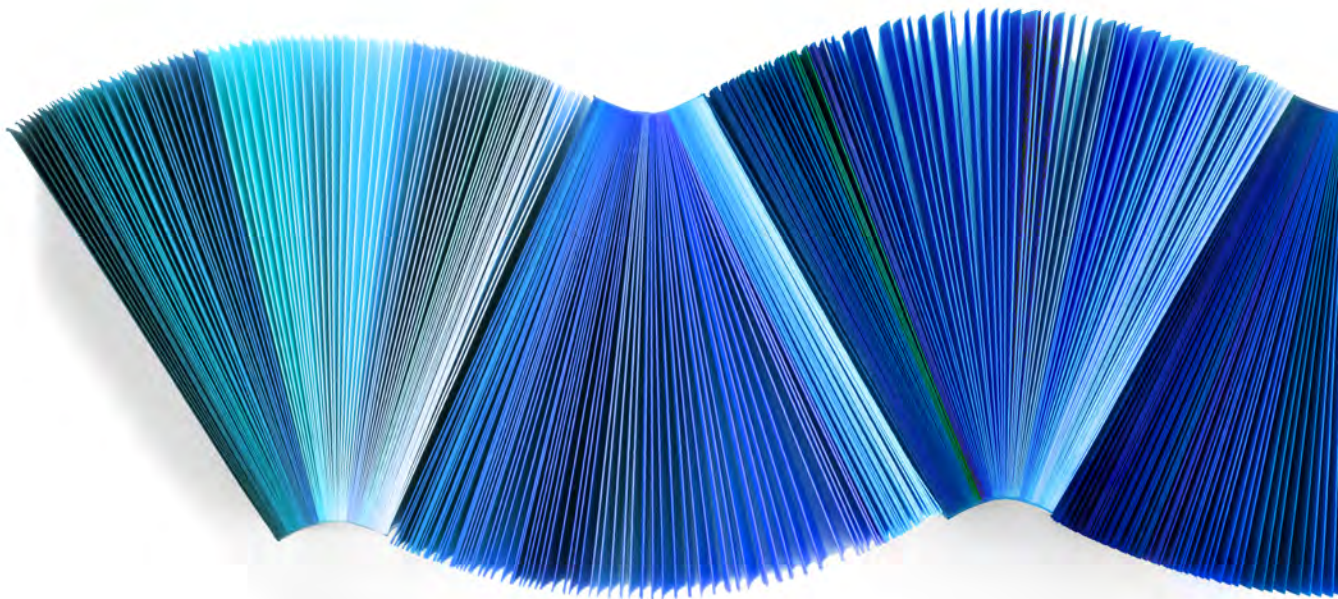
SENIOR IT MANAGER,
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These results help create a compelling business case for Agent Intelligence – especially when our own experience suggests humans are consistently no more accurate at performing these kinds of activities and, what’s more, machines typically get more accurate over time.

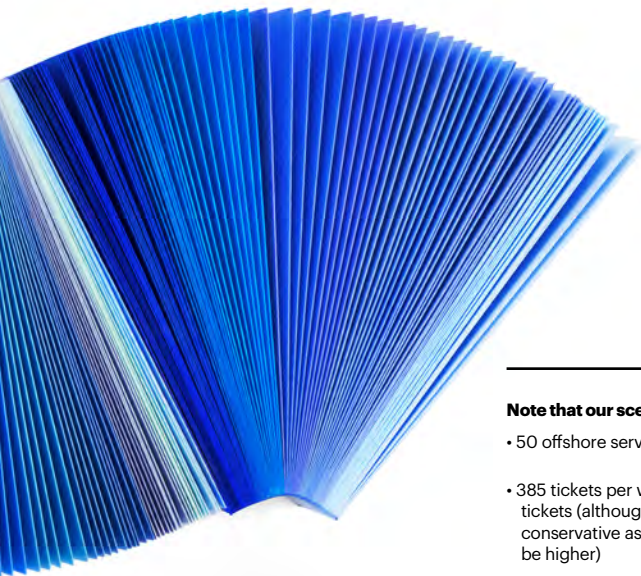
The pilot also demonstrated the powerful potential of Agent Intelligence to bring significant monthly time savings for an organization. These time savings offer the opportunity for FTEs to focus on judgement-based work, increasing productivity and SLA compliance and providing improved customer experience. Assuming that one full-time equivalent staff member (FTE) equates to 2,080 hours of work in a year, then the monthly time savings achieved across five of the pilot customers translate into the following:

PILOT CUSTOMER	ESTIMATED NUMBER OF TICKETS PER MONTH	ESTIMATED NUMBER OF SERVICE DESK AGENTS	ESTIMATED TOTAL SERVICE DESK EFFORT PER MONTH (HOURS)	ESTIMATED PROPORTION OF TIME SPENT ON TICKET CATEGORIZATION, PRIORITIZATION AND ASSIGNMENT	ESTIMATED TIME SAVED PER YEAR THROUGH AGENT INTELLIGENCE (HOURS)
A	40,000	300	52,000	8%	37,939
B	14,000	28	4,853	20%	8,503
C	10,200	400	69,333	10%	72,384
D	-	70	12,133	10%	7,717
E	20,000	50	8,667	10%	6,448
Average	21,050	170	29,397	12%	26,598



Clearly this is a wide range of results based on a relatively small sample size and variances due to data quality and volumes are to be expected. But it does demonstrate real potential. Furthermore, when we modeled a scenario for a typical front-line customer support function using these accuracy and coverage results (together with some conservative assumptions), our findings were impressive: an ROI of **42 percent**, with benefits exceeding **\$100,000** over three years and a payback period of just **10 months**:

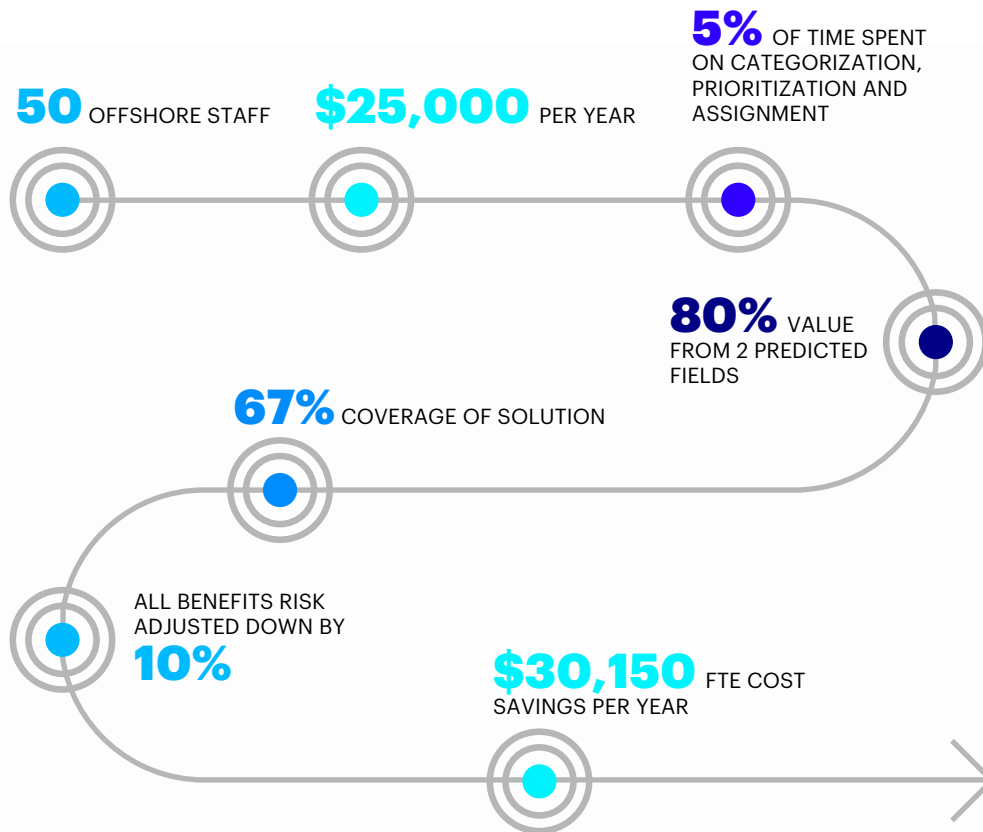
BENEFIT COMPONENT (ECONOMIC)	YEAR 1	YEAR 2	YEAR 3	TOTAL
Increased productivity: rapid ticket creation and routing	\$22,613	\$30,150	\$30,150	\$82,193
Increased productivity: less time wasted on incorrect ticket routing	\$226	\$302	\$302	\$829
Improved customer experience: a faster, more accurate process	\$4,568	\$6,090	\$6,090	\$16,748
Increased SLA compliance: a faster, more accurate process	\$457	\$609	\$609	\$1,675
Total Benefits	\$27,863	\$37,151	\$37,151	\$102,165



Note that our scenario is based on the following key assumptions:

- 50 offshore service desk agents with an average loaded cost of \$25,000 per year
- 385 tickets per week with 5 percent of effort spent on categorizing, prioritizing and assigning tickets (although pilot customers estimated an average of 12 percent, we applied a more conservative assumption but recognize that estimates for an individual service organization may be higher)
- Externally facing front-line customer support function in company with revenue of \$1b and potential SLA breach penalties of \$250,000
- Agent Intelligence accuracy of 71 percent and coverage of 67 percent
- Input data is used to predict two output fields, resulting in 80 percent of the benefits (where predicting three output fields equates to 100 percent of the benefits)
- Benefits realized for 9 months of Year 1 and all benefits risk adjusted down by 10 percent to reflect uncertainty

CALCULATING YEAR 2 BENEFITS FOR INCREASE PRODUCTIVITY: RAPID TICKET CREATION AND ROUTING



In addition to these benefits, customers involved in the pilot also recognized the importance of machine learning solutions that do not incur significant investment costs or barriers to entry.



SPEED OF DELIVERY IS ONE AREA THAT KEEPS US COMPETITIVE, SO WE WOULD BE LOOKING TO ALIGN THIS TO OUR STRATEGY TO DRIVE INNOVATIVE SOLUTIONS AND GENERATING REVENUE. THE SMALL CHANGE CAN HAVE A RIPPLING EFFECT – IF INCIDENT RESOLUTION TIME CAN BE IMPROVED, THE FASTER WE CAN ENSURE DELIVERY AND SALES.



**Senior IT Manager,
Retail Company**

Agent Intelligence compares favourably to many other machine learning solutions because it is natively integrated within the ServiceNow platform. This avoids the excessive costs associated with the need for additional hardware, storage and other infrastructure, ongoing support and maintenance, integration with other solutions, data transfer aggregation and normalization and additional information security reviews.

Furthermore, its ease of use means it's unlikely to require significant expenditure in areas like engaging external professional services to set up the engine, training of agents, recruiting niche skills, or building the models that will derive the value.

KEY EVALUATION CRITERIA TO SUPPORT BUSINESS CASE			
COST COMPONENTS	COST CERTAINTY	NATIVE INTEGRATION WITH SERVICE MANAGEMENT SOLUTION	EASE OF USE
Software licenses	✓		
Hardware, storage and other infrastructure		✓	
Solution support and maintenance		✓	
Professional services			✓
Training or recruitment			✓
Integration with other solutions		✓	
Data transfer, aggregation, normalization and clean-up		✓	
Information security reviews		✓	
Algorithm design, build, train and test			✓

A final important point: because the application of machine learning in front-line customer support is still evolving, we strongly recommend a process of rapid prototyping. ServiceNow's approach to experimentation and prototyping will help create a detailed and compelling business case to secure the funds needed to derive the full benefits of the technology.

CONCLUSION

Wherever you look, workloads are increasing. And humans are often the bottleneck in clearing them. Leading organizations are turning to intelligent automation through machine learning to alleviate the pressure, freeing humans to work in a different way. Yet, for many, the technology's potential remains largely untapped.

Front-line customer support functions in service organizations – whether they're serving internal or external customers – continue to be challenged to both improve customer experience and reduce service costs. And that's the perfect opportunity for intelligent automation.

Machine learning techniques using pattern recognition are ideal for many of the typical activities that are performed every day in every front-line customer support function. Whether that's ticket categorization, prioritization or assignment, it's tackling the activities that play a significant role in improving customer experience and reducing service costs.

ServiceNow is already recognized as an industry leader with its integrated platform for enterprise service management. Now, with the addition of Agent Intelligence, we've shown that it's capable of bringing ever greater business value to an enterprise.

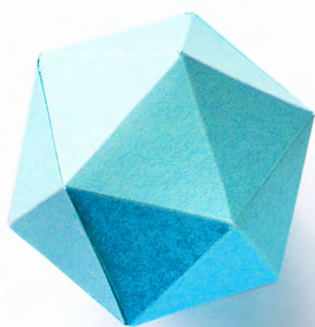
By providing easy-to-use machine learning capabilities that are natively integrated with the rest of the ServiceNow platform, we believe Agent Intelligence offers a compelling solution for service organizations seeking to automate work, improve customer experience and reduce costs. It's a fast track to amplifying the potential of an organization's people – and getting work done with intelligence.



KNOWING THAT SERVICENOW IS LOOKING AT MACHINE LEARNING, WE WANTED TO SEE WHAT THEY HAVE AND WHERE THEY ARE GOING WITH IT BECAUSE THERE IS A BIG PUSH IN OUR ENVIRONMENT TO AUTOMATE AS MUCH AS POSSIBLE. MACHINE LEARNING IS A NEW SPACE NOT CURRENTLY USED IN PRODUCTION [AND WE ARE] HOPING TO HAVE BETTER CUSTOMER SERVICE, EFFICIENCY, AND DRIVE DOWN COST. [OUR AIM IS TO] REDUCE THE NUMBER OF LOW-VALUE TASKS TO REPURPOSE THE SERVICE DESK AGENTS FOR HIGHER-VALUE TASKS IN IT THAT DRIVE VALUE FOR THE BUSINESS, AS OPPOSED TO TICKETS LOGGING.



**Customer Support Technology & Operations Manager,
Multinational Energy Company**



ABOUT THIS RESEARCH

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- This report was commissioned by ServiceNow and is not meant to be used as a competitive analysis.
- Whilst ServiceNow reviewed and provided feedback for this report, Accenture maintains editorial control over its findings and did not accept changes that contradict our perspective or obscure key messages.
- ROI calculations are based on several assumptions and we strongly recommend that readers use their own assumptions and modelling to determine their own specific business case.
- Where Accenture interviewed ServiceNow customers, ServiceNow helped organize the meetings but did not participate in the interviews.

REFERENCES

¹ **Accenture Technology Vision 2016**
(<https://www.accenture.com/gb-en/insight-intelligent-automation-technology>)

² **ServiceNow Customer Value Research of 380 customers**, August, 2017

³ **ServiceNow Customer Pilot Programme of 6 customers**, August 2017

⁴ **ServiceNow Intelligent Automation Engine**
(<https://www.servicenow.com/now-platform/intelligent-automation-engine.html>)

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