

ESG Research Insights Paper

Leveraging AI and ML for Greater Impact

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Executive Summary

Report Conclusions

Machine learning (ML) has become an increasingly important part of IT today. This effect is seen both in how IT leverages machine learning to improve operations and in how IT supports and enables the lines of business (LOBs). Still, organizations have limited understanding on its effective use and have made limited progress in associating it with business outcomes.

ESG recently surveyed 320 IT and business professionals familiar with their organization's data analytics environment, including usage of or plans for machine learning. These respondents represented both large midmarket (500 to 999 employees) and enterprise organizations (1,000 or more employees) in North America. The survey included representation from multiple industry verticals including financial, manufacturing, health care, and retail.

Based upon the data collected as part of this research project, ESG concludes:

- **Machine learning is key to operational efficiencies for businesses.** Most organizations consider machine learning one of their most important business and IT priorities. When investing in ML, companies see improved operational efficiencies as their most important objective.
- **Machine learning is still siloed in IT.** While machine learning can be used across an organization, the current use is still focused within IT itself. IT is leading the way both in terms of using ML and defining the strategy for it. Companies need help to find ways to expand ML beyond IT and into the lines of business and executive teams.
- **A knowledge and skills gap is locking away the power of machine learning.** Significant challenges still face organizations looking to unlock the power of machine learning. Organizations still see barriers to leveraging ML, such as the lack of experienced or trained staff and the lack of better IT infrastructure required to support ML. Over 80% of respondents are using three or more tools for ML, which greatly complicates the iterative, cyclical learning process that drives ML. This leads to issues with time to business value, with over 50% expecting ML to take more than a year to return significant business value, with nearly one in five expecting it to take more than two years.

Importance of Machine Learning for Operational Efficiency

ESG undertook this research project to better understand the dynamics of machine learning (ML), artificial intelligence (AI), and the applicability in helping creating IT solutions. This research focused on the current strategies employed and the existing challenges faced when applying ML technologies and processes to both business and IT activities, and the future requirements and next-generation solutions that will affect these efforts down the road. The results looked at the plans and implementation strategies to judge where ML is potentially misaligned today and how it needs to evolve in the near future.

One area that is emerging for businesses is the importance of ML for their business priorities, especially leveraging it for improving operational efficiencies. There has been a recent increase in interest in ML, across a number of different IT segments, creating new opportunities for businesses to leverage machine learning and AI, and spending levels are starting to follow accordingly. Businesses are finding that machine learning can help them drive the automation in their management environments, better understand the most effective operating models, and identify root causes of issues previously hidden, all of which drive interest in and spending on ML and AI initiatives. Indeed, according to a separate ESG research survey, when it comes to specific spending plans for data analytics in 2017, 14% of respondents identified ML as one of their five most significant areas of spending.¹

A significant measure of the importance of machine learning, beyond spending patterns, is the relative position of analytics among all projects and initiatives that companies are prioritizing. ESG asked respondents to rate the importance of analytics projects and initiatives relative to business and IT priorities, over the next 12-18 months. The data in Figure 1 shows the relative importance against all business priorities and against all IT priorities. Relative to business priorities, analytics projects and initiatives were cited by 25% of respondents as their most important priority. Analytics were one of the top five priorities relative to all business priorities of nearly two-thirds (39%) of respondents. When compared to all IT priorities, analytics were the top priority for 14% of the respondents and either the top priority or one of the top five priorities for 57% of respondents.

¹ Source: ESG Brief, [2017 Data Analytics Spending Trends](#), January 2017.

Figure 1. Importance of Analytics Initiatives



Source: Enterprise Strategy Group, 2017

What can be seen from the responses is that for both IT-specific and business priorities, analytics projects and initiatives are a high priority. Thus, machine learning needs to be easy to use, and the value it generates must be available not only to IT itself, but also to the lines of business and executive teams. This is achieved by improving automation and providing smarter interfaces and applications enabling the IT and business teams to be more proactive versus reactive, especially as companies look beyond analyzing IT metrics and information and start applying analytics to the data that impacts the business itself.

But what exactly are the business impacts that companies are looking to achieve through ML? To understand the business impacts of ML, the respondents were asked to identify the most important business benefit objectives for their investment in ML and AI. The respondents were asked to select all objectives that were applicable but also to indicate their most important objective.

What ESG found from the research data is that improving operational efficiency is the most important objective respondents hope to achieve through investing in machine learning and artificial intelligence. It was the most commonly cited objective among all objectives, with 38% of respondents, and the single most important objective cited by 16% of respondents (see Figure 2). Also of note is that the second most-cited important objective, more predictive insights into future scenarios or outcomes, is closely aligned to operational efficiency. These results point to the conclusion that businesses are looking at ML not just for risk mitigation or historical reviews but also for ways to proactively make their businesses better. They want insights into how to proactively transform their businesses via intelligence built into their offerings and automation to help drive operational efficiency. The application of ML for predictive insights is fairly unique among IT solutions and one of the reasons that ML is so beneficial for both IT and the business as a whole.

Figure 2. Machine Learning Objectives

In terms of business benefits, what are the most important objectives you expect to accomplish from your organization’s investments in the area of ML &AI? Which is the single most important objective? (Percent of respondents, N=320)



Source: Enterprise Strategy Group, 2017

Ease of Use for Machine Learning Beyond IT

One critical issue for driving business impacts from machine learning is whether business users across the company are actually able to apply the value of machine learning. Business impacts cannot be driven solely through the analytics and actions taken by IT itself. With the use of ML by the overall business in mind, ESG asked companies what lines of business were furthest along in terms of their ML and AI usage or plans. The respondents could choose up to three lines of business for their responses.

As can be seen in the data, IT is far and away the furthest along in ML and AI usage today, as cited by 51% of the respondents (see Figure 3). In terms of the differential between IT and other lines of business, IT was cited by over two and a half times as many respondents as the next most-cited line of business, sales and marketing. These results are problematic for companies looking to drive significant business impacts, especially operational efficiencies, from groups outside of IT.

Figure 3. Machine Learning Progress by Functional Groups/Role

What lines of business are furthest along in terms of ML & AI usage or plans? (Percent of respondents, N=320, three responses accepted)



Source: Enterprise Strategy Group, 2017

We can conclude that the benefits of ML are in critical demand and can often be challenging to attain because of the complexity of the current offerings. There’s an opportunity for data science-driven applications that remove obscurity and simplify ML to deliver targeted solutions that lines of business and executives can get value from.

But is it simply a case where IT is the sole group driving the strategy for machine learning? Do other members of the organization, who represent the lines of business, show interest in ML as well? ESG asked the survey respondents who is responsible for defining ML and AI initiatives and strategies in their organization, with multiple responses accepted.

What can be seen from the results is that IT is the current leading organization defining ML and AI initiatives. Specifically, Figure 4 reveals that 42% of the respondents identified senior IT executives, while another 30% cited the IT infrastructure and operations team. But unlike the question about the use of ML, there isn’t a significant gap between IT and the other lines of business. Both senior and line of business executives were selected by over 20% of the respondents and other groups, including data scientists, business analysts, and data engineers were not far behind. These two sets of results show that there is broad interest in ML across lines of businesses and users but that the actual usage of ML lags outside of IT. These two sets of results show that there is broad interest in ML across lines of businesses and users but that the actual usage of ML remains greatest in IT.

Figure 4. Machine Learning Influencers and Stakeholders



Source: Enterprise Strategy Group, 2017

Machine Learning Knowledge and Skills Gap

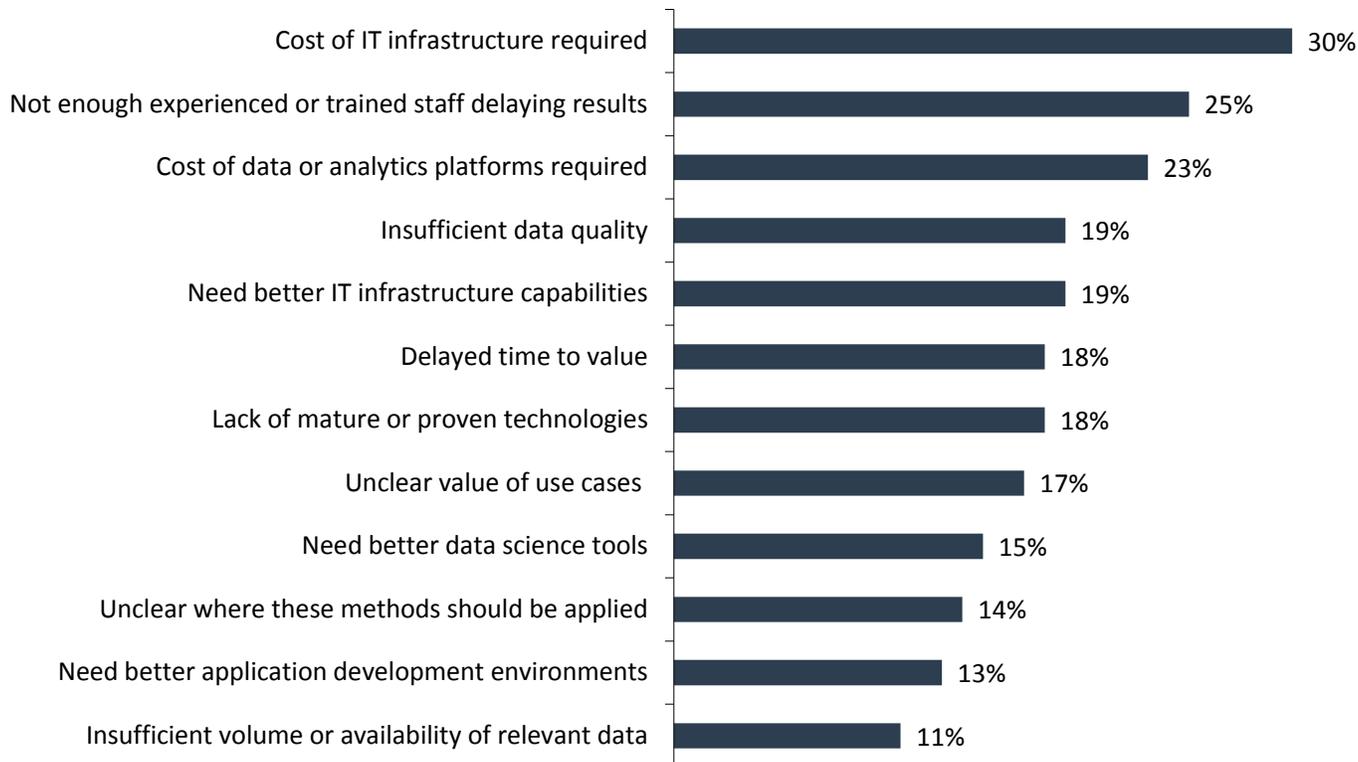
As we look deeper into why the power of machine learning hasn't gone beyond IT, we need to look at what the barriers to greater adoption might be. Companies are struggling to recruit and retain enough skilled staff to meet their personnel requirements in support of data-intensive tasks such as analytics. A separate ESG research survey reveals that organizations have a problematic skills shortage in the area of BI and analytics (28%) and/or database administration (23%).² The ML/AI specialization is a more scarce subset of that overall shortage and could be the biggest issue hindering a more widespread adoption of these initiatives, unless the supporting technology solutions are greatly simplified or packaged for easier consumption.

To address specific machine learning challenges, the survey respondents were asked what the biggest challenges or barriers were that their organizations have experienced or are concerned about experiencing with ML and AI. The results from this question show a number of key challenges for machine learning. Beyond the issues with costs, which affect most IT technologies, the key issues are around the ability to support the use of ML (see Figure 5). The second most identified challenge or barrier was that organizations did not have enough experienced or trained staff, which delays results, with 25% of the respondents citing this issue. The skills shortage is often a combination of both the lack of available or trained staff, and the fact that the current solution is too difficult or specialized to be used by more users. In addition to hiring and training more users, having a solution that is easier to use would lower the barrier of entry for ML. Other support challenges, such as the need for better IT infrastructure and the delayed time to value, are also related to how companies are struggling to get up to speed with the requirements to best leverage ML.

² Source: ESG Brief, [2017 Cybersecurity Spending Trends](#), March 2017.

Figure 5. Challenges and Concerns with Machine Learning

What are the biggest challenges or barriers your organization has experienced – or has concerns about experiencing - with ML & AI projects? (Percent of respondents, N=320, three responses accepted)

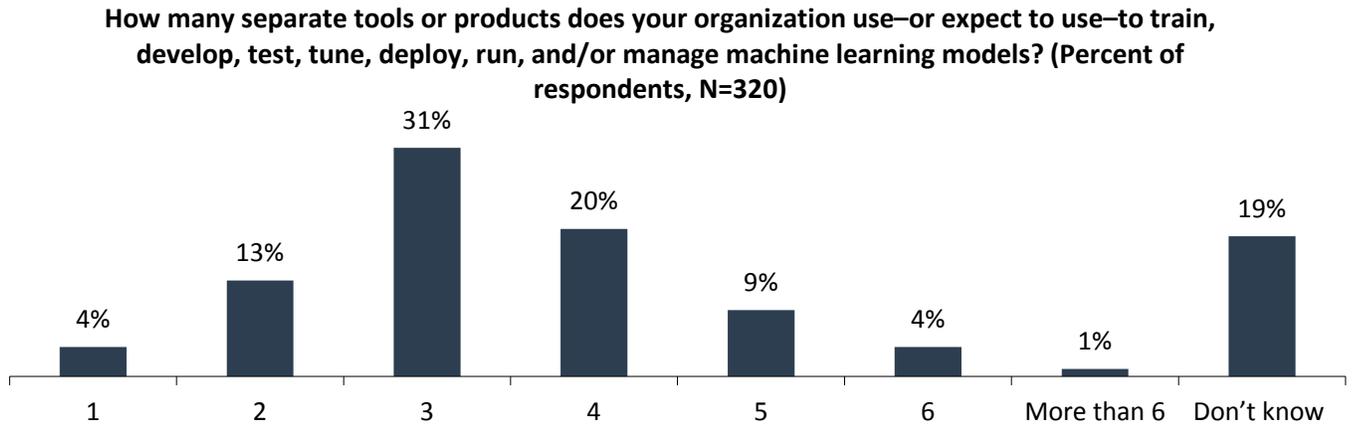


Source: Enterprise Strategy Group, 2017

Another challenge for companies attempting to leverage machine learning is the complexity of the tool sets in current use. One of the fundamental attributes of ML is that the use of ML models is an iterative process, where both the user and the data processing learn from the previous use and leverage the previous results and experiences to refine and improve on the next model. The problems arise when the iterative process is not fully implemented, due to the number of tools required to perform ML. When multiple tools are used in ML, the community of experience and knowledge sharing is significantly smaller than when users all use a single tool. ESG asked the survey respondents how many separate tools their organization used or expected to use with their machine learning models.

As can be seen in Figure 6, companies are using or expect to use a significant number of tools for ML. Only 4% of respondents are using a single tool for ML, while nearly two thirds of respondents are using three or more tools for ML. Nearly one-fifth of the respondents don't know how many tools their organization is using for ML. While it may not be reasonable to expect all companies to standardize on a single tool for ML, the more tools that are used to build the ML models, the greater the complexity of the ML usage experience and the less consistency there is to foster the iterative model of ML. These results point to the need for an ML solution that is both easy to use for the broad user set but flexible enough to be customizable for the powerful models needed for advanced users. The ability to leverage a smaller set of tools is critical to reducing operational complexity and improving the learnings from experiences and analysis.

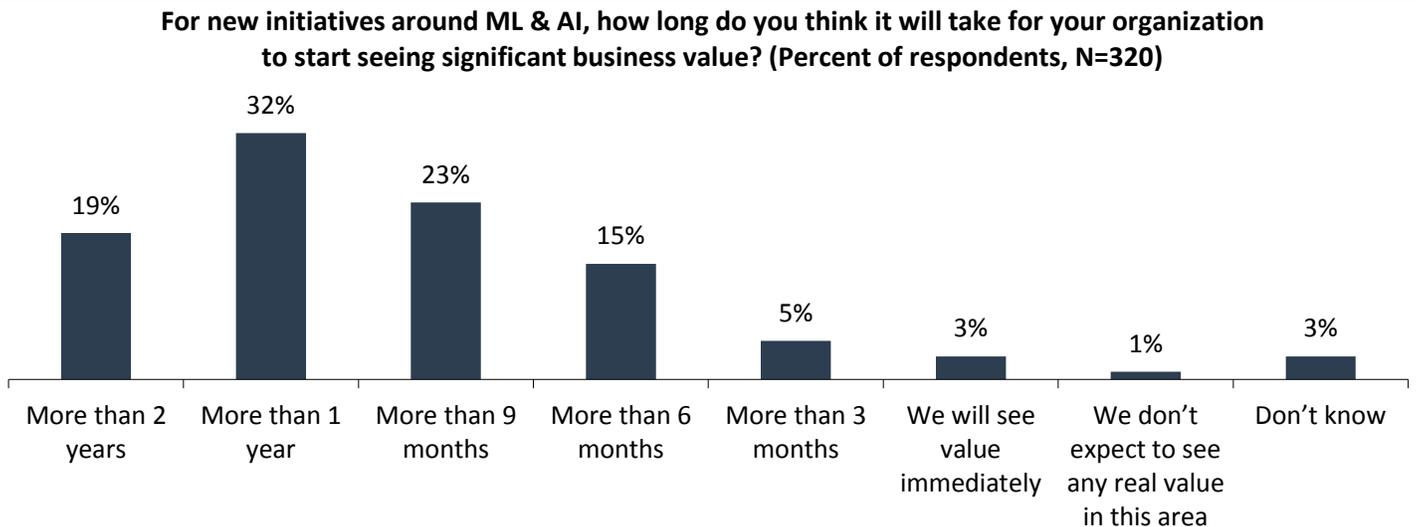
Figure 6. Current or Expected Extent of Machine Learning Tool Usage



Source: Enterprise Strategy Group, 2017

We have seen a number of barriers that are preventing companies from unlocking the power of ML. Given the challenges stated above, the time to value for business results is also suffering. The survey respondents were asked how long they think it will take for their organization to start seeing significant business value from ML and AI. The results in Figure 7 show that, while organizations overwhelmingly still expect to see business value from machine learning, the timeframe is longer than most IT-based projects are given. Over half of all respondents think that it will take more than one year to see significant business value from ML, with one-fifth expecting it to take more than two years. While it is often difficult to see immediate gains from new technology, the current time to value for ML is skewed towards longer timeframes. These results are likely related to the other results we have seen in the survey, such as the lack of personnel and resources supporting ML, and the ubiquity of complex tool sets that adversely affect how ML progresses within a company.

Figure 7. Time to Value Expectations for Machine Learning



Source: Enterprise Strategy Group, 2017

How Splunk Is Helping Address These Issues

So what is needed to address these issues? First, companies need a machine learning solution that can meet the primary objectives for using machine learning. This means the ML solution needs to drive operational efficiencies and help companies become more proactive in their operations. With ML, companies can drive operational efficiencies through automation and prediction. The current processes of basic automation and scripting that work for hundreds or even thousands of data points are not sustainable. The explosion of data happening today and anticipated for the future means there can be hundreds of thousands or even millions of data points; ML-driven automation and prediction is critical to handle the sheer volume, velocity, and variety of the data being generated.

Second, companies need a machine learning solution that addresses the needs of both IT and the lines of businesses. For those who are more advanced with their ML initiatives, the ML solution needs to provide the power they need to exploit the data, including custom modeling environments that allow them to take action on the results. Those that are earlier in their ML journeys or that don't have data science expertise, such as the lines of business, likely need greater guidance and ease of entry into the usage of ML. This sets the stage for solutions that have prepackaged ML models, with applicability to use cases like IT, cybersecurity, sales and marketing, and operations and logistics, to drive the use and benefits of ML across the business.

Finally, companies need to leverage a machine learning solution that helps address the skills and knowledge gaps that exist in ML. Companies should look to solutions that minimize the typical time involved to get value from machine learning and the expertise of people required to do so.

Splunk provides a platform that turns machine data into answers in real time. With Splunk Enterprise and Splunk Cloud, customers can analyze and ask questions of data from any source, at scale, to get the insights they need. Splunk offers AI solutions that provide applied machine learning to get value from all of this data, through packaged or custom ML options, as well as platform capabilities to help organizations achieve fast time to value with their machine learning initiatives.

Data wrangling is one of the most difficult, time-intensive steps in getting value from machine learning. This is one of Splunk's strengths—handling data prep and addressing problems with the data set so that organizations can focus their time on using machine learning to make decisions and avoid bigger problems later on. Splunk's platform approach provides the ability to prep the data without the need to move it for analysis.

Splunk IT Service Intelligence (ITSI) and Splunk User Behavior Analytics (UBA) are prebuilt, use case-specific solutions that leverage packaged machine learning via advanced adaptive thresholding and anomaly detection techniques, helping organizations proactively detect incidents, reduce resolution times, and predict and prevent undesired outcomes, without the need for a data scientist.

The Splunk Machine Learning Toolkit (MLTK), a free app available on Splunkbase, enables custom machine learning for any use case on the Splunk platform. It provides a guided workbench for creating, testing, and deploying models, and includes commonly used machine learning algorithms that can be applied to the data. In addition, the MLTK provides an extensible API for developers to import any machine learning algorithms (proprietary or open source) and operationalize them as a Splunk dashboard, alert, or report.

Splunk allows organizations a range of options for getting value from their data, with solutions that are packaged for less advanced users, as well as those that are more customizable for advanced users. The result is a single platform that is both easy to use yet flexible enough to be customizable.

The Bigger Truth

The ESG research data shows that there are still significant barriers to greater adoption of machine learning in most enterprises. While the benefits of machine learning are known throughout the business, and interest in using it is growing, actual ML usage is primarily centered within IT itself. For most of the lines of business and executives, the power of ML is still locked away behind barriers of complexity, skill shortages, and an overabundance of tools.

ESG found there is still significant opportunity for organizations to capitalize on the interest in and benefits of machine learning. Companies need to look for an ML solution that can break through the barriers found in this research. These solutions need to provide both custom capabilities for advanced analytics but also ease of use for new users, through guided and prepackaged models. Most importantly, the solutions need to support an iterative learning environment, which is essential for machine learning.

The bigger truth is that, while the use of machine learning is just starting, it will become a critical part of any organization's success. The massive explosion in data will make existing automation processes less effective over time. The power of machine learning can help companies move from solely automating processes to automating decision making and ongoing optimization, which will be needed to meet customer expectations and stand out from competition. Now is the time for companies to accelerate their machine learning experiences and begin to measure their results in months and days, not years. Companies that adopt solutions like Splunk will find themselves well positioned to unlock the power of machine learning for the success of their organization.

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