

DRIVING INNOVATION WITH AI GETTING AHEAD WITH DATAOPS AND MLOPS



TOPICAL SURVEY

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FOREWORD

Artificial intelligence (AI), machine learning (ML) and data science are among a large group of buzzwords associated with major breakthroughs in the way business is done and better outcomes are achieved. In this study, we will examine the mechanisms behind those success stories and the methods that come into play to achieve them. In short, we will focus on the concepts of DataOps and MLOps and their impact on the application of ML. We will evaluate the perception and adoption of these concepts in detail as well as their contribution to the success of AI, or more specifically, ML applications in enterprises. Therefore, we will be addressing the functional scope of DataOps extended by MLOps without differentiating between the two. This is an exploratory study that provides an overview and uncovers interrelationships.

Because there are conceptual challenges linked to DataOps and MLOps, we would like to share our understanding of these two concepts first. This will illustrate why we do not distinguish between them throughout this study.

DataOps and MLOps: Only a gradual transition from one to the other

Because of the large functional overlap and various interpretations, marking borders between DataOps and MLOps is arbitrary and never produces satisfactory results. Therefore, we will consider these concepts as one for the purposes of this study.

DataOps focuses on the realization of a manageable, maintainable and automated flow of quality-assured data. The goal is to achieve transparency

regarding all interdependencies across involved systems along an end-to-end data pipeline. It is a concept that fosters collaboration between experts and makes the process of developing data products more agile and efficient. It is relevant for all kinds of data products whose success depends on being up to date.

This also applies without exception to machine learning (ML) models, which are a particular kind of data product. As such, the development and deployment of ML models are accompanied by special requirements such as retraining, testing, tracking of relevant performance metrics and versioning of different model configurations as well as the general management of code. The maintenance of efficient and automated processes for the fulfillment of these special requirements is addressed by MLOps.

Therefore, we regard MLOps as a functional extension to DataOps. Both concepts derive from DevOps principles and could be regarded as an extension to it with a special focus on the quality, validity and reliability of data as a carrier of logic.

We view DataOps, MLOps and DevOps as concepts for the design of processes which ensure the seamless operation of software and data products. Tools and solutions in this area generally provide functions and technical frameworks for the support of these processes.

Alexander Rode and Timm Grosser
Würzburg, May 2022

MANAGEMENT SUMMARY



01 HIGH-PERFORMING ML APPLICATIONS ARE ANYTHING BUT THE NORM IN TODAY'S ENTERPRISES

Most companies are only just beginning to tap the benefits of ML for themselves. 55 percent of the companies represented in this survey have not deployed a ML model yet and only 10 percent consider themselves advanced in this area.

As soon as ML models are ready to be transferred into production, things really start to get complex. Deployment is a difficult hurdle for many companies to overcome.

02 DATAOPS AND MLOPS ARE GENERALLY ACKNOWLEDGED CONCEPTS TO COPE WITH THE TYPICAL CHALLENGES OF ML

These concepts live up to their reputation and provide successful solutions to numerous challenges (e.g., efficient collaboration, documentation, monitoring, automation).

Companies familiar with topics around DataOps and MLOps have more realistic expectations about what they can achieve with machine learning and can better plan ML projects. Data/MLOps users are 3.5 times less likely to be confronted with overwhelming complexity.

The introduction of Data/MLOps enables ML models to be deployed faster and more efficiently as well as ensuring quality in operations. Data/MLOps adopters are 4.2 times more likely to be able to deploy quickly (within weeks or days).



RECOMMENDATION

Developing ML models is the easy part. Get informed early about the challenges of deployment by learning about DataOps and MLOps. This will help to prepare you as well as avoid setbacks and unpleasant surprises.



RECOMMENDATION

Before relying on the results and proper functioning of ML models in production, ensure you have everything under control if something goes wrong. DataOps and MLOps can give you a good guide to figure out what can go wrong, how to avoid mistakes, and how to react quickly when the need arises. In this way, you can secure the safe application of ML and ensure its acceptance.

MANAGEMENT SUMMARY



RECOMMENDATION

You can use open source as long as you can handle the complexity. Commercial tools, especially platform solutions, can help you to better cope with complexity and to deploy faster. Base your software selection on current and future requirements (e.g., monitoring and documentation). In terms of future requirements, you can also draw on the concepts of DataOps and MLOps.



RECOMMENDATION

Don't forget to strengthen support for ML and data science throughout the company. The technical and procedural implementation of DataOps and MLOps is an important requirement for the successful application of ML, but resistance and unreasonable fear among employees can establish an insurmountable barrier to progress.

03

THE RIGHT ML TOOLING CAN HAVE A SIGNIFICANT IMPACT ON ML SUCCESS AND HELP MAKE DATA/MLOPS PROCESSES EASIER TO IMPLEMENT

The ML tool stacks of most companies are dominated by open source solutions, while platform solutions are still used relatively rarely.

The complexity-reducing and efficiency-increasing effect of commercial tools and platform solutions comes into its own once ML models are deployed. ML practicing users of commercial tools are 8.25 times less likely to report being overwhelmed by complexity than users of open source solutions.

Among practitioners in the field of ML, users of open source tools struggle more frequently with overwhelming complexity and are less likely to be able to deploy quickly.

04

BENEFIT FROM DATAOPS AND MLOPS WHILE INCREASING SUPPORT ACROSS THE ENTERPRISE

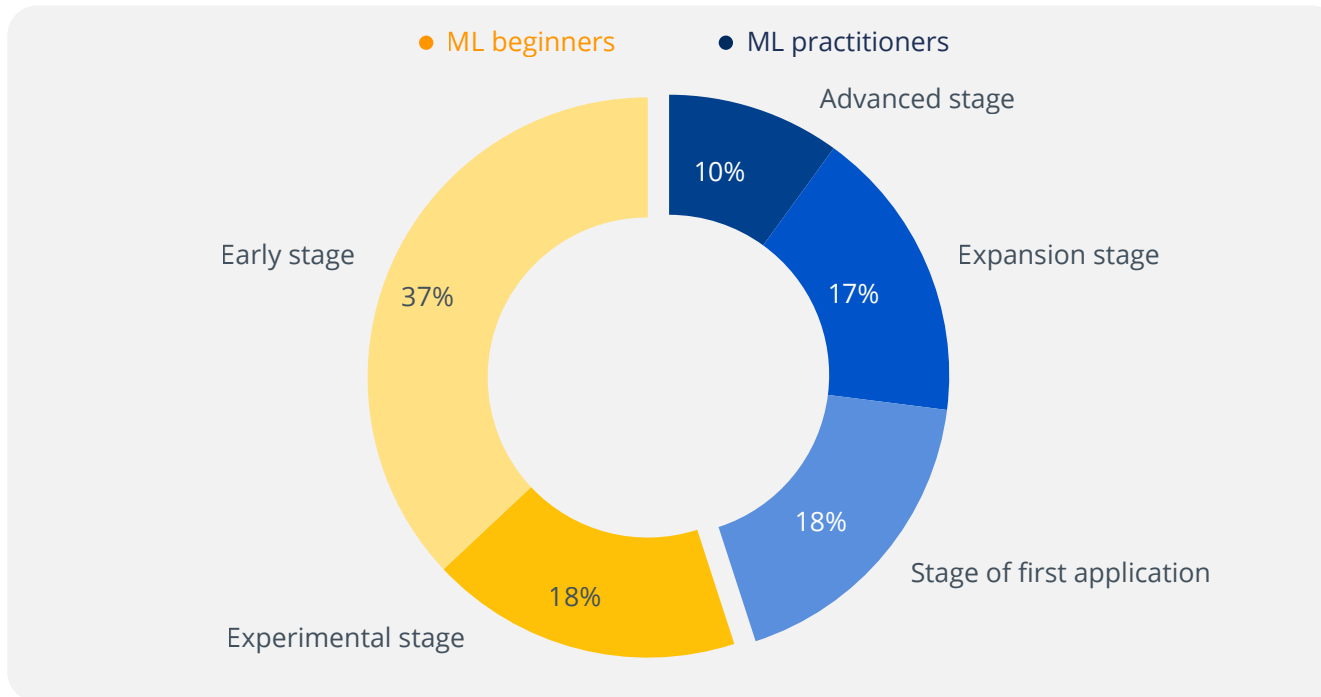
The benefits achieved through Data/MLOps also positively influence the success of other measures such as hiring experts and making use of new tools, platforms and infrastructure.

Adopters of Data/MLOps seem to focus more on technical and procedural improvements than on measures to anchor a data-driven mindset throughout the company by generally increasing data competency.

01 HIGH-PERFORMING ML APPLICATIONS: ANYTHING BUT THE NORM



DEPLOYED OR NOT DEPLOYED: DIFFERENCES BETWEEN ML PRACTITIONERS AND BEGINNERS MATTER



Please describe your company's level of advancement in the area of machine learning (n=248)

Our survey results are surprising and also somewhat deceptive. Despite the hype and numerous success stories over quite a period of time, the majority of companies seems to be stuck in an early phase of ML advancement.

More than half of our survey participants (55 percent) have not yet operationalized any ML models, and those who have not even started developing ML models make up the largest group (37 percent). This result reflects a reality where

many companies are only now discovering the potential of ML.

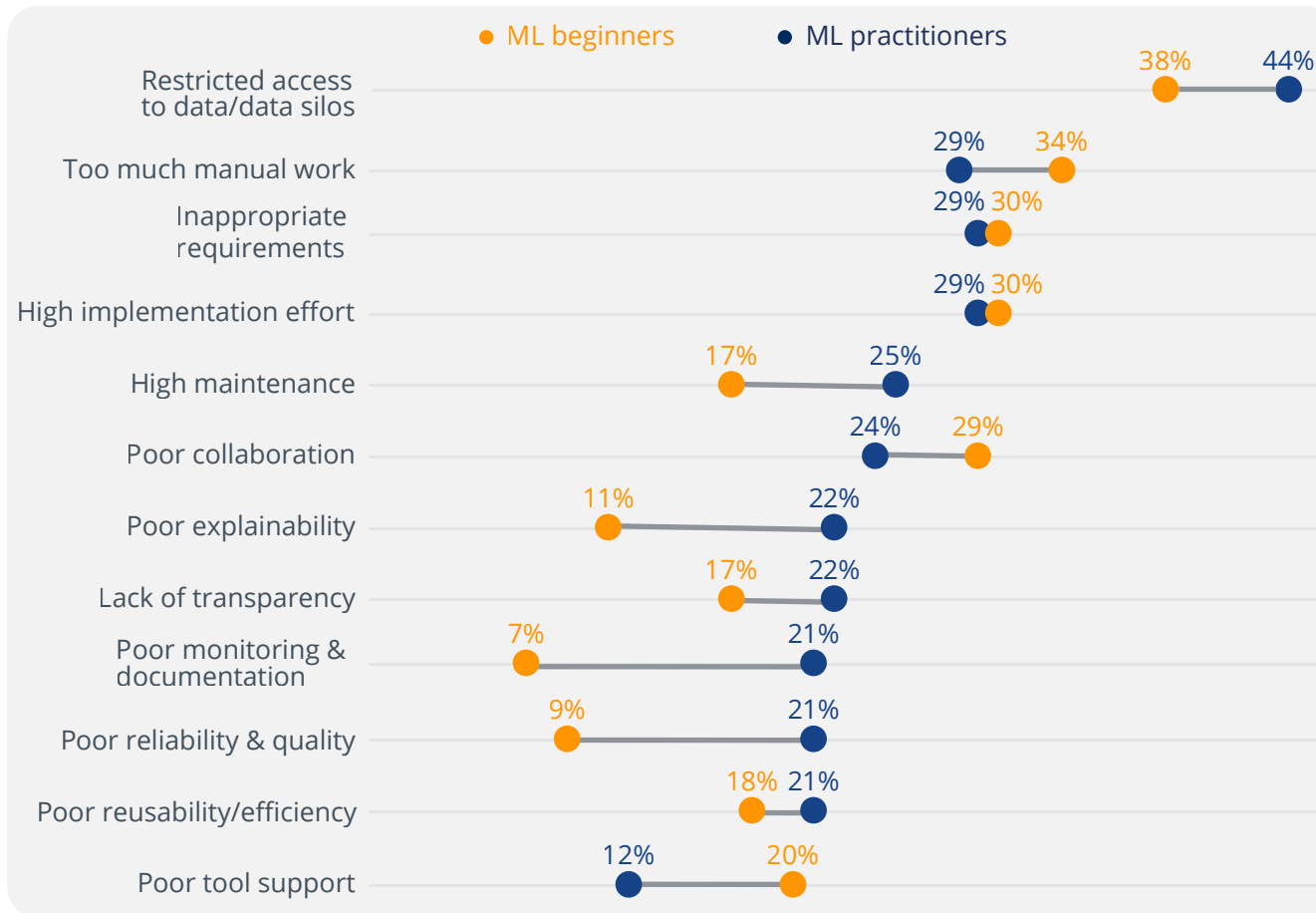
Interesting insights are provided by a differentiated view of those who already operate ML models and those who have not yet implemented ML models. Challenges change with the scale and complexity of ML initiatives. The differentiated view gives us an impression of what to pay attention to initially, in the short term, but also the challenges that may arise in the medium to long term.

Therefore, we will regularly differentiate between companies that have already deployed at least one ML model (ML practitioners) and those that have not (ML beginners).

01 HIGH-PERFORMING ML APPLICATIONS: ANYTHING BUT THE NORM



EACH ML LEVEL GETS HARDER: THE FURTHER YOU COME, THE MORE CHALLENGES YOU HAVE TO OVERCOME



What are the main problems your company is facing when developing and deploying ML models? (n=244)

On average, ML practitioners indicated that they currently face 3.5 of the 12 problems available for selection in the survey. This rate exceeds that of beginners by more than 20 percent.

Presumably, practitioners face more challenges than beginners in general. This underscores the assumption that well-managed and high-performing ML solutions, often presented as flagship projects, are not at all the norm in applied ML and most companies struggle to deliver them. Practitioners have already structured and professionalized their work and see manual effort, collaboration and the use of tools as problems significantly less frequently than beginners.

Nevertheless, we see significantly greater problems in operation. These include challenges of being able to build up on prior work, establishing transparency with regard to interdependencies, maintaining running applications and ensuring the monitoring and documentation of important artifacts as well as the reliability, quality and explainability of generated results.

01 HIGH-PERFORMING ML APPLICATIONS: ANYTHING BUT THE NORM



This finding is reminiscent of other code-oriented projects, such as loading a data warehouse. Despite the best intentions to document ETL code properly, maintain metadata and create reusable code using standard functions, the reality is often different. The reason for this usually stems from the pressures of flexible day-to-day business coupled with growing complexity in the data landscape and increasing dynamic requirements. Either there is a lack of time or the structures for sustainable code creation and efficient operation are not in place. This picture is similar in the area of ML. But in this case we have the chance to do better.

The problem with data silos is also worth highlighting. Data silos represent one of the biggest challenges of our time. This also applies in the area of ML, for practitioners (44 percent) even more than for beginners (38 percent). From our point of view, this challenge can be addressed with the help of an overarching data strategy and cultural change regarding the handling of data.

As we will see later, the underrepresentation of other problems not mentioned here is rather an indicator of a lack of awareness than the absence of problems.

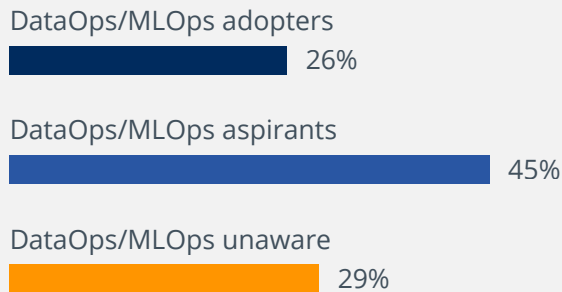
For **44%** of ML practitioners
and **38%** of ML beginners,
restricted access to data silos is the biggest
challenge when developing and
deploying ML models.



02 DATAOPS AND MLOPS ARE PROMISING APPROACHES FOR GREATER EFFICIENCY IN ML



IMPORTANCE OF DATAOPS AND MLOPS WIDELY ACKNOWLEDGED



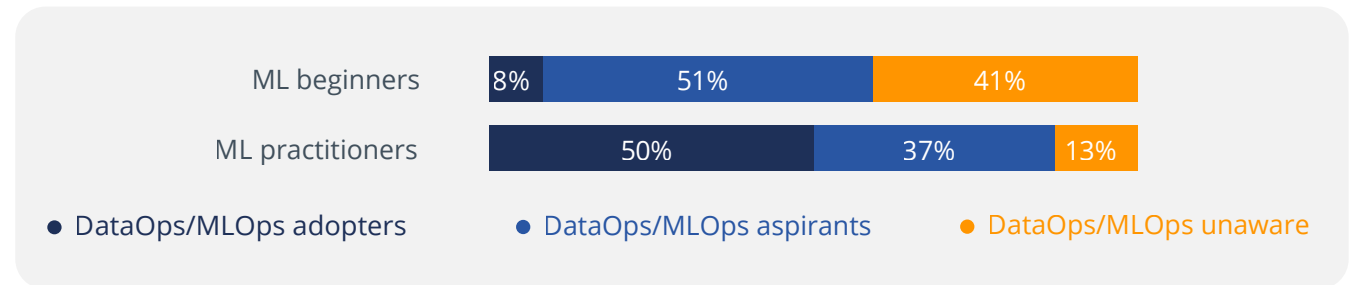
DataOps/MLOps adoption status (n=228)

Developing and deploying ML successfully is challenging and its complexity is often underestimated, as indicated by 68 percent of our respondents. It is widely believed that the implementation of DataOps and MLOps enables companies to cope with these complex challenges and to increase efficiency.

As the majority of companies represented in this survey has not even deployed operationalized ML models yet, it is not surprising that the proportion of those already adopting Data/MLOps is not very large at 26 percent (see chart).

Since the percentage of those companies that plan to work with Data/MLOps in the future (aspirants) is very large at 45 percent, it can be concluded that DataOps and MLOps are widely perceived as promising approaches that have only been adopted by a few pioneers to date.

Even among ML beginners, the majority of companies at least have plans to work with Data/MLOps (51 percent) and a small percentage have even started to implement it (8 percent). The importance of DataOps seems to be widely acknowledged across all ML maturity levels.



Adoption of DataOps/MLOps by ML practitioners and beginners (n=228)

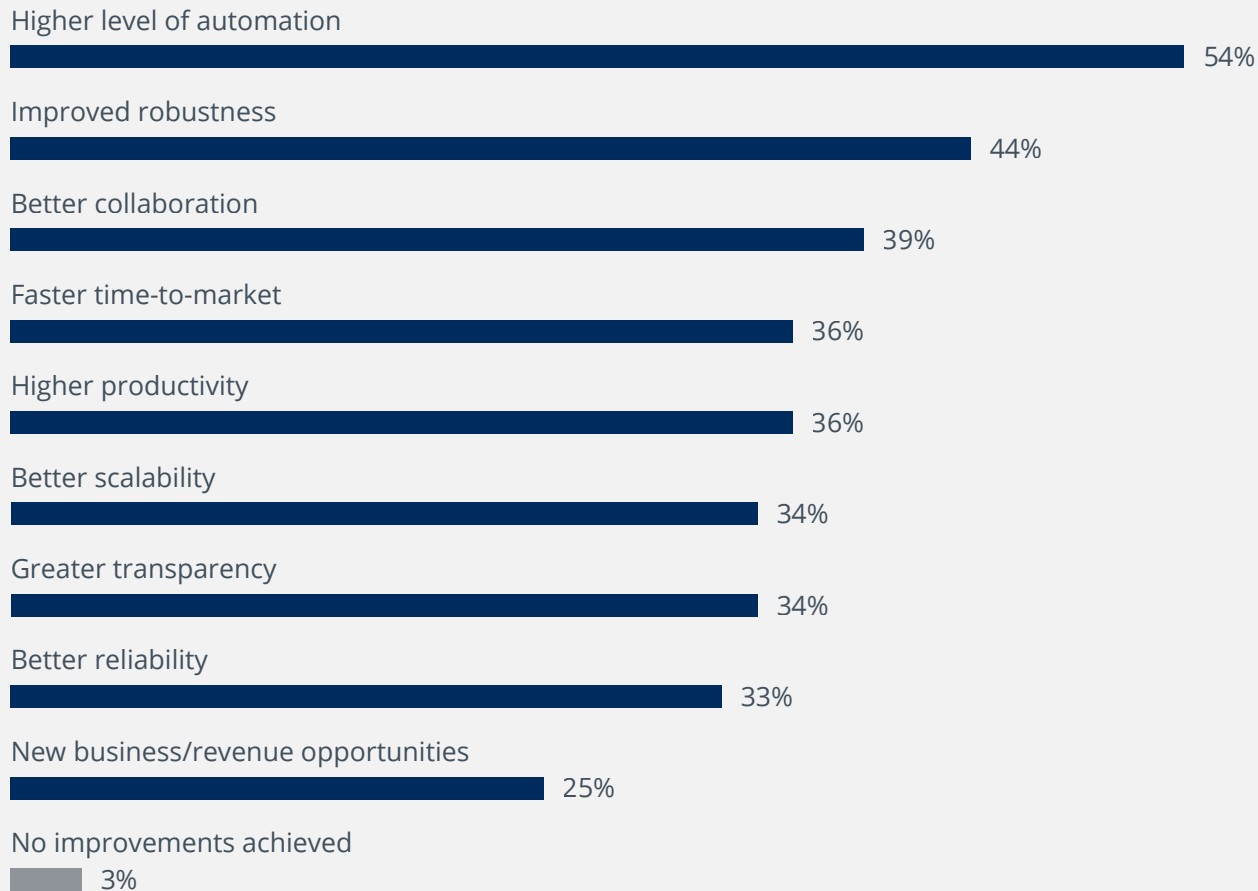
This impression becomes even more apparent when we differentiate between ML practitioners and beginners (see chart). ML practitioners have mostly started to adopt DataOps and MLOps (50 percent) or are evaluating steps to do so (37 percent). There seems to be no way around Data/MLOps to cope with the complexities arising from the deployment of ML.

But why should anyone care about DataOps and MLOps before they have operationalized any ML models? It is certainly advisable to address the objectives of these concepts early on in order to become aware of the many problems that may arise during the deployment of ML. Starting to deploy and rely on ML models that are not backed by adequate worst-case precautions can lead to disappointment and even disaster.

03 POSITIVE IMPACT BEYOND QUESTION



WIDE RANGE OF ACHIEVED IMPROVEMENTS



Which significant improvements has your company achieved with the introduction of MLOps/DataOps? (n=61)

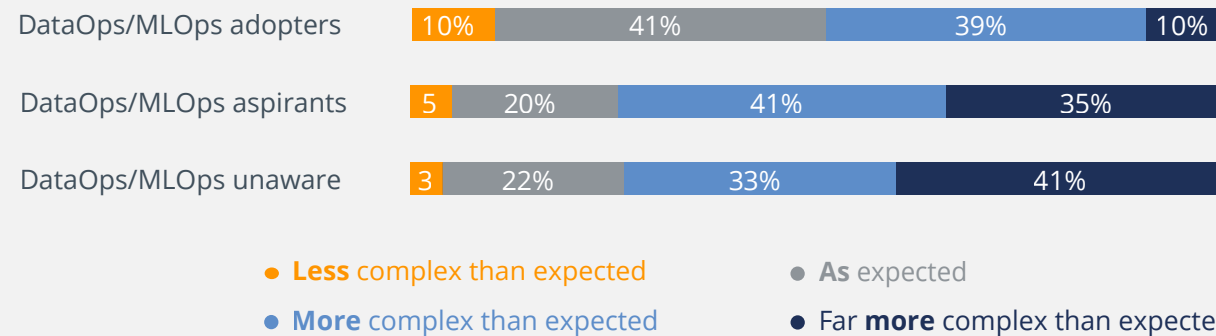
When asked which measures most increased success through the use of ML, DataOps and MLOps adopters primarily cited strategic integration of these very concepts (59 percent). 97 percent of those claimed to have achieved significant improvements through the implementation of Data/MLOps. Advantages in terms of automation, robustness of the application and collaboration top the list of achievements through Data/MLOps.

The numbers in the chart indicate that engaging in DataOps and MLOps is a good idea.



03 POSITIVE IMPACT BEYOND QUESTION

FAMILIARITY WITH DATAOPS AND MLOPS LEADS TO MORE REALISTIC EXPECTATIONS



Comparison of complexity assessment, by DataOps/MLOps implementation status (n=218)

Asked whether their initial expectations regarding the positive impact of ML were met, 53 percent of adopters of Data/MLOps, 45 percent of aspirants and only 31 percent of those unaware of Data/MLOps agreed. Indeed, the 'unaware' showed higher rates of both exceeded expectations and disappointment. These results suggest that companies familiar with topics around DataOps and MLOps have more realistic expectations about what they can achieve with machine learning. As we will see, this finding will be confirmed when we come to evaluate expected complexity.

Adopters of these concepts are less likely to be surprised by unforeseen complexities: 41 percent described the level of complexity "as expected".

There is a greater difference in perceived complexity between those companies that have already adopted DataOps/MLOps and those that are just considering doing so. Since around three-quarters of the latter group (76 percent) say they underestimated the complexity of using ML, it is reasonable to assume that they only

began to explore DataOps and MLOps after being overwhelmed by the complexity of applied AI.

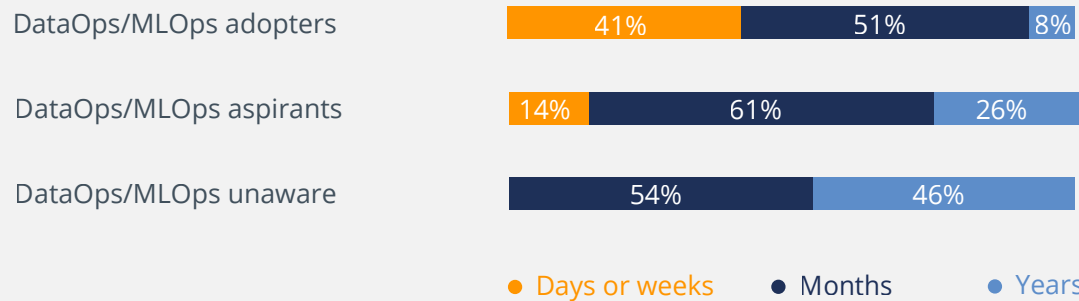
Pragmatic approaches to ML are usually unproblematic in the early stages of testing and deployment, but caution is advisable as soon as important decisions and functions depend on the proper functioning of ML models. Carelessness here can lead to general distrust and rejection of ML results.

Over **70%** of the DataOps/MLOps aspirants and unaware underestimated the complexity of machine learning adoption.



03 POSITIVE IMPACT BEYOND QUESTION

DATAOPS AND MLOPS FOR FASTER DEPLOYMENTS



Time from development to deployment by ML practitioners, by DataOps/MLOps adoption status (n=102)

Our results prove that adopters of DataOps and MLOps achieve faster time-to-market, higher productivity, better scalability and higher levels of automation. These are all measures of improved efficiency and speed in delivering ML results. An examination of the time taken from development to deployment seems to confirm these findings (see chart).

Adopters of Data/MLOps are significantly less likely to spend “years” on this process (8 percent versus 26 percent/46 percent). While deployments taking “months” seem to be the standard and do

not show much variation in terms of Data/MLOps adoption, faster deployments lasting just “weeks” or “days” are common among adopters but are unheard of among the unaware.

With regard to beginners, companies that have not yet put ML models into production but are at least considering implementing DataOps/MLOps are generally less likely to expect very long implementation times lasting years.

DataOps and MLOps not only facilitate shorter implementation times but also forge the

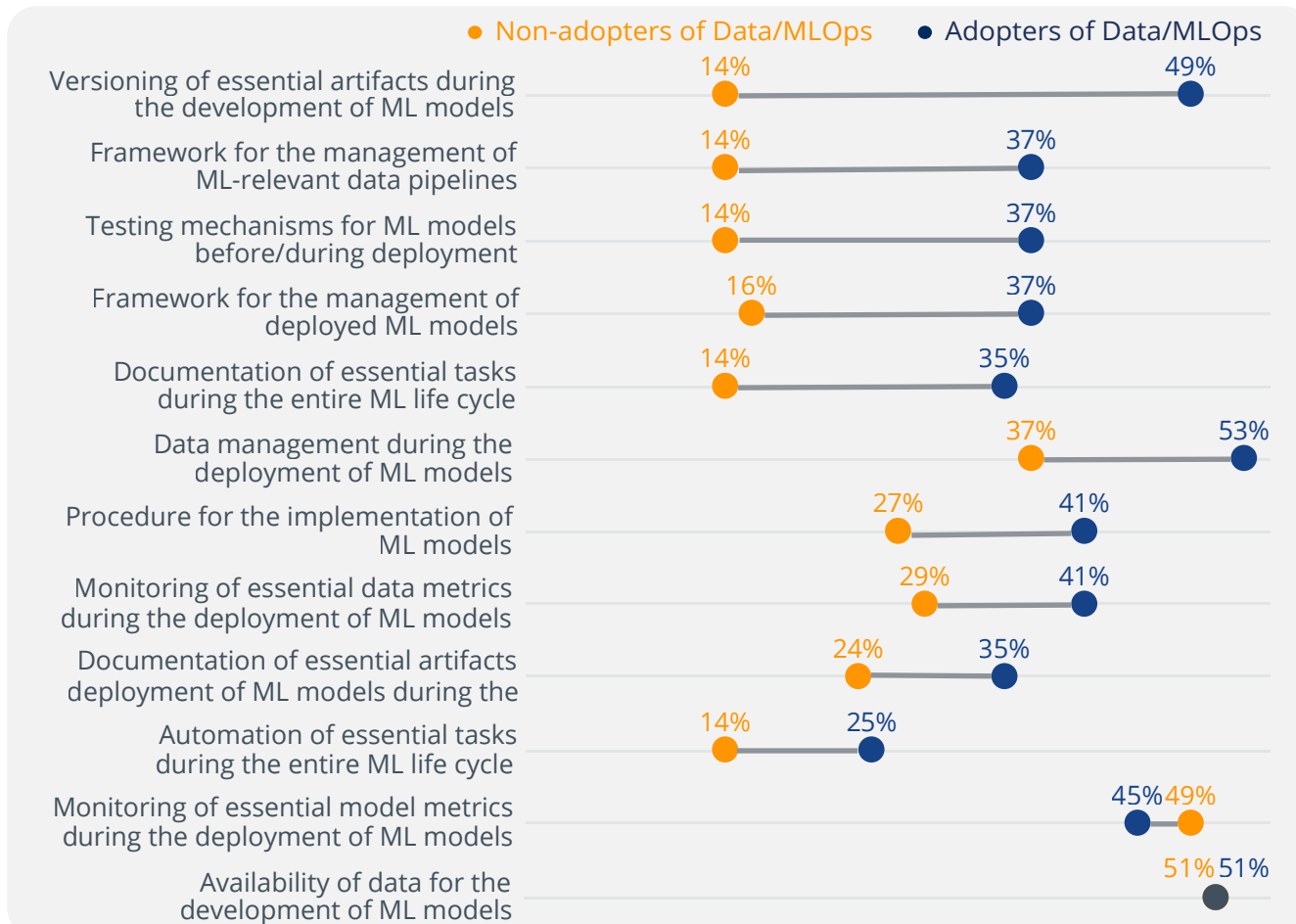
confidence to be able to deliver faster when deployment is on the agenda. The latter effect seems to be achievable by merely familiarizing oneself with the concepts and their implications.

None of those respondents unaware of DataOps/MLOps spent less than “months” on the process from the development of a machine learning model to its deployment.



03 POSITIVE IMPACT BEYOND QUESTION

DATAOPS AND MLOPS AS THE CONCEPTS TO COPE WITH ML CHALLENGES



Challenges that companies already have a good solution for, by ML practitioners, by DataOps/MLOps adoption status (n=102)

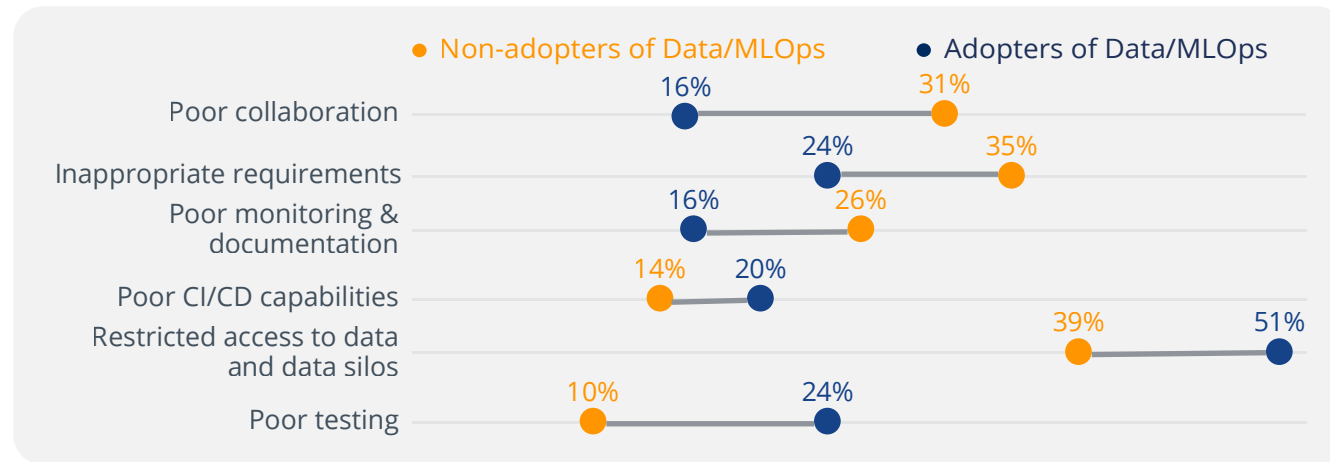
Adopters of Data/MLOps are better off in almost every respect when it comes to the indicators of a good solution to tackle the typical challenges of ML (see chart). On average, adopters selected more than twice as many answer options as non-adopters (4.5 versus 2.2).

Adopters do particularly well in the areas of versioning and documentation, providing management frameworks and testing. In the case of monitoring essential model metrics, a lower proportion of adopters compared to non-adopters claim to have a good solution for this purpose. This finding can probably be attributed to adopters having higher demands in terms of model quality.



03 POSITIVE IMPACT BEYOND QUESTION

DATAOPS AND MLOPS AS THE CONCEPTS TO COPE WITH ML PROBLEMS



Problems experienced by ML practitioners, by DataOps/MLOps adoption status (n=102)

In turn, we would also expect that adopters of Data/MLOps face fewer problems when deploying ML models. Indeed, this is the case, but the advantage in adopting Data/MLOps is not as significant as we imagined. In selecting an average of 3.4 of the 16 options presented in our survey, adopters of Data/MLOps do not differ much from those who deploy ML without putting these concepts into use (3.8 out of 16). Apart this marginal quantitative difference, significant variations regarding response behavior can be observed (see chart).

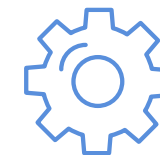
The most significant effect can be identified with collaboration. Adopters of MLOps generally seem to be better placed to overcome the barriers that hinder effective cooperation between stakeholders. The need to overcome this problem is apparently one of the main drivers of the adoption of Data/MLOps. This is underlined by a comparison of the roles involved in the development and deployment of ML. The average number of different roles involved for adopters is 4.2, which is significantly higher than the 3.0 for ML practitioners not using Data/MLOps.

Besides procedural improvements in the areas of monitoring and documentation, reducing manual effort and ensuring reliability and quality, adopters of Data/MLOps are significantly less likely to have problems with unrealistic requirements from departments and management. Presumably, this observation is closely related to the better management of expectations of Data/MLOps adopters described above. When realistic expectations about what is possible and achievable prevail, dealing with excessive demands is easier.

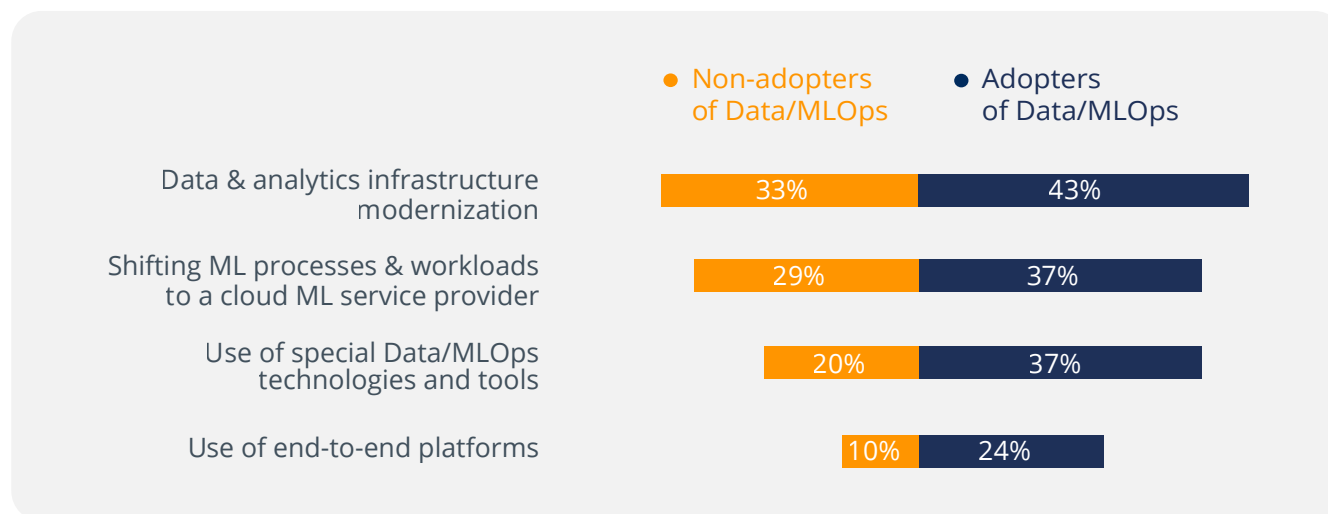
The higher frequency of problems relating to poor CI/CD and testing capabilities most likely indicates a keener awareness of these challenges on the one hand, and also that they seem to be downstream challenges that may well be harder to solve.

However, handling restricted data access and data silo issues seems to be outside the scope of most Data/MLOps initiatives, as this problem is even more widespread among adopters.

04 SOFTWARE SELECTION MATTERS



DESPITE THE ADVANTAGES OF COMMERCIAL TOOLS, OPEN SOURCE STILL DOMINATES



Successful tool and infrastructure related measures taken by ML practitioners, by DataOps/MLOps adoption status (n=102)

The adoption of good DataOps and MLOps procedures is generally independent of the nature of the tools used. Nevertheless, tools can have an important impact. The chart shows that adopters of DataOps and MLOps stated significantly more often that they have achieved successes through tool and infrastructure related measures. A general comparison of the impact of using open source, self-developed and commercial tools,

especially solution platforms, sheds some light on the relevance of software selection.

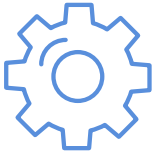
In terms of the tool stack for realizing AI applications, adopters of Data/MLOps do not differ significantly from everyone else. Overall, half of the companies surveyed have bet on open source tools, almost a third (31 percent) use commercial tools and 19 percent have built their own tools.

The predominance of open source has multiple reasons:

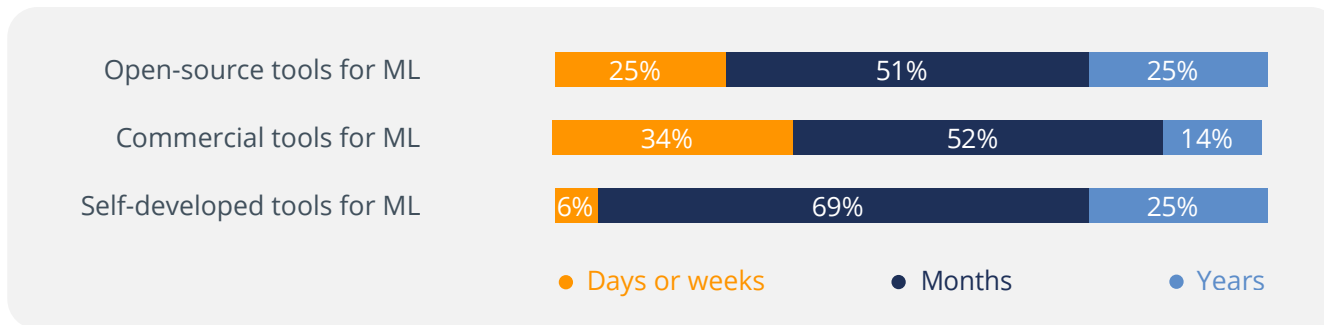
- The open source community is a major driver of innovation
- The open source community is vivid and active
- Open source solutions are free and instantly available
- Open source is predominantly used for knowledge transfer in educational institutions

On the other hand, the market for commercial tools in the field of AI is far from consolidated and no standard tools have yet become established. The market is highly competitive and marketing departments are constantly coming up with new buzzwords to describe their tools, so choosing suitable commercial tools is anything but easy. Nevertheless, it can be well worth the effort. Many vendors are increasingly able to make the functionality of open source solutions more user-friendly by reducing complexity, while at the same time incorporating the many advantages of open source through open, adaptable and compatible tool design.

04 SOFTWARE SELECTION MATTERS



POSITIVE IMPACT OF COMMERCIAL TOOLS WHERE ML IS OPERATIONALIZED



Deployment durations by ML practitioners, by type of ML tools (n=102)

A comparison of the duration of ML practitioners' deployments (see chart) reveals a comparative advantage in the use of commercial tools. Their users are more likely to be able to deploy in short timespans of days or weeks, and they are less likely to take years to deploy. Companies that work with in-house developments come off the worst in this comparison.

However, beginners do not expect shorter implementation times when working with commercial tools. In this respect, beginners who use open source or self-developed tools are more confident. A possible reason for this could be that they do not take operational considerations

seriously enough when purchasing ML tools. Commercial tools for the development of ML models should therefore always be checked for suitability with regard to requirements for the operationalization of the models (e.g., do they provide adequate interfaces and functions?).

A further distinction regarding tool usage between beginners and practitioners is evident when it comes to the perceived complexity. While the tool type does not make a lot of difference to beginners, practitioners using commercial and self-developed tools are far less likely to be caught out by overcomplexity when addressing their machine learning requirements.

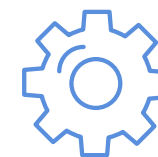
The almost equal figures for users of open source tools indicate that ML practitioners can better curb complexity with commercial tools than with open source tools.

Users of self-developed tools also perform better than open source users. However, the use of self-developed tools does not seem to be common practice, with only 16 percent of ML practitioners reporting that they use them. We also often observe that users of self-developed ML tools tend to switch to commercial tools as their ML maturity level increases.

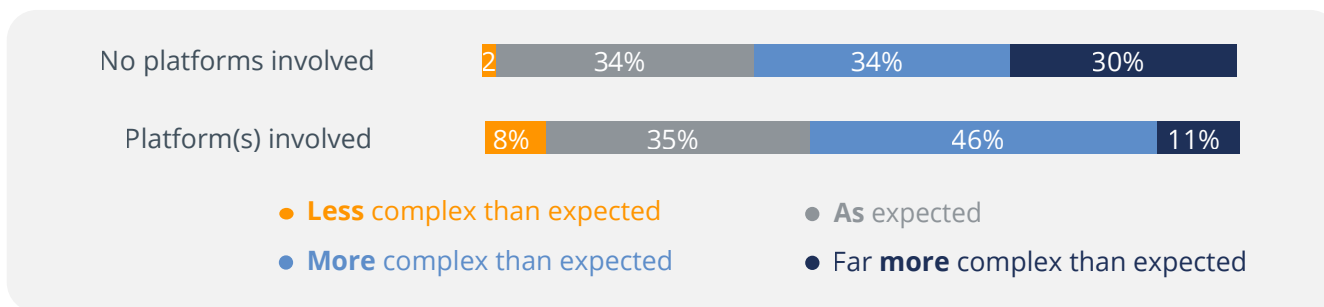


Tool stacks compared by actual complexity vs. expected complexity, by level of advancement (n=100)

04 SOFTWARE SELECTION MATTERS



PLATFORM SOLUTIONS FOR REDUCED COMPLEXITY



The impact of platform usage on perceived complexity by ML practitioners (n=87)

Another potentially appealing option to reduce complexity is to use platforms that combine the functionality of several solutions or even cover the whole process from development to deployment (end-to-end). Most companies combine several solutions to realize the development and

deployment (53 percent). The second most popular option is to run separate platforms for development and deployment (23 percent). Using a platform for one or the other accounts for only 17 percent of our data, while end-to-end-platforms are used by only 6 percent of the respondents to this survey.

There are no major differences between ML practitioners and beginners regarding the general usage of platforms. Surprisingly, 43 percent of the companies that have not yet deployed a ML model (beginners) state that their ML deployment requirements are already covered by some form of platform.

For almost **1 in 3** companies without a platform, ML projects are far more complex than expected.

This is only true for **1 in 10** companies with a platform.

ML practitioners in companies equipped with some sort of platform are much less likely to experience “far more” complexity than expected. Presumably, the use of platforms can help to reduce complexity.

Of course, implementing DataOps and MLOps goes far beyond software selection, but the impact of well-chosen tools is not negligible. They can make a great contribution by providing frameworks for the definition of processes as well as technically assisting and facilitating the fulfillment of crucial tasks.

Generally, it makes sense for beginners to find their way around and explore new functions with open source or free versions of commercial tools before purchasing expensive licences. Again, from our perspective, studying the principles of DataOps and MLOps and learning how to apply them in practice can facilitate the identification of important requirements and help to avoid common mistakes and setbacks on the road to successful ML deployment.

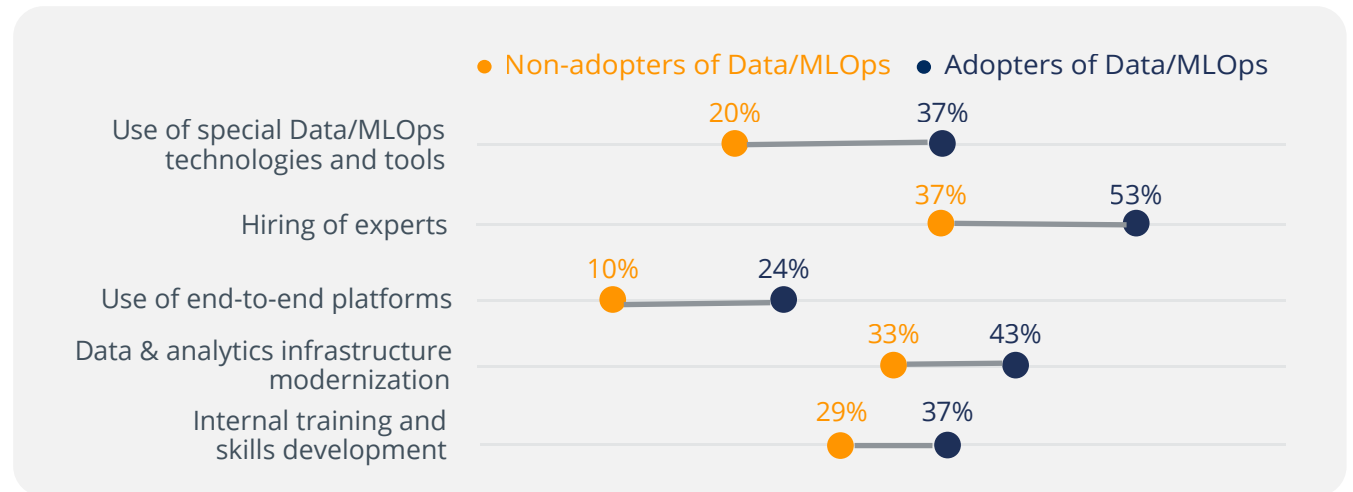
05 COMPANIES ARE GETTING AHEAD WITH DATAOPS AND MLOPS, BUT SHOULD BE CAREFUL TO BRING EVERYONE ON BOARD



MEASURES AND OBSTACLES ON THE WAY TO THE SUCCESSFUL USE OF ML

Almost **2 in 3** adopters consider the strategic integration of DataOps/ MLOps to be highly conducive to success with ML.

We have already outlined that DataOps and MLOps are valuable concepts for successful and efficient ML initiatives. Indeed, survey data on the success of 12 individual measures supports this finding. 59 percent of Data/MLOps adopters consider the integration of these concepts to be highly conducive to success with ML. However, there are other promising measures as well. On average, adopters were 52 percent more likely to state that a given measure had been instrumental in increasing success. Looking at the biggest differences between adopters and non-adopters of Data/MLOps in the chart, it is reasonable to assume that the implementation of Data/MLOps also has a positive impact on the success of other measures.



Comparison of effective measures taken by ML practitioners, by DataOps/MLOps adoption status (n=102)

Adopters of DataOps and MLOps also seem to be better able to attract capable experts on the labor market who can generate added value. This is no surprise, as they can usually better ensure a professional working atmosphere because they have already put effort into making collaboration work and establishing management frameworks for ML. Nevertheless, the lack of personnel, especially in the area of advanced analytics, also remains a challenge for adopters of Data/MLOps.

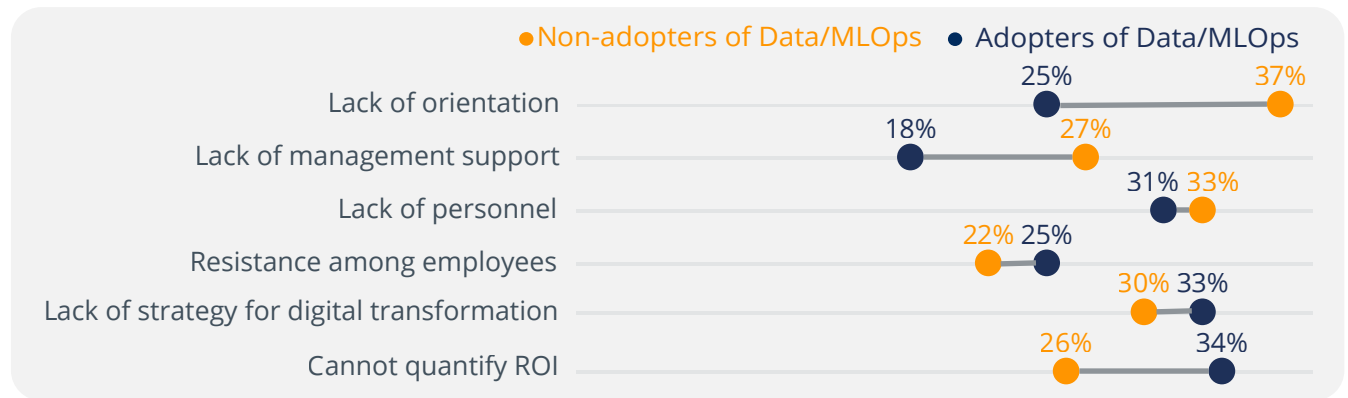
However, we can state that they have a greater ability to profit from the use of new technology and modernized infrastructures, as they are probably more capable of selecting suitable tools and profiting from their range of functions. This assumption is supported by our finding that adopters are significantly less likely to see a lack of orientation as a challenge (see chart on the next page).

05 COMPANIES ARE GETTING AHEAD WITH DATAOPS AND MLOPS, BUT SHOULD BE CAREFUL TO BRING EVERYONE ON BOARD



Another significant differentiator for Data/MLOps adopters is that they are less likely to perceive a lack of management support as a challenge. Generally, management support is very important in the initial phases of introducing ML. Conviction, or at least a significant leap of faith on the part of decision-makers, is critical to any initiative to make ML work in organizations. One would expect the issue of management support to gradually dissipate as these initiatives begin to have a positive impact. We assume that most of the adopters responding to our survey have already successfully overcome this hurdle.

However, among the many benefits that users of Data/MLOps have achieved, problematic aspects emerge that have a striking correlation. Adopters focus less on measures to increase approval for ML in the wider company context and put less effort into enforcing more cross-role collaboration, as shown in the chart. It seems that adopters



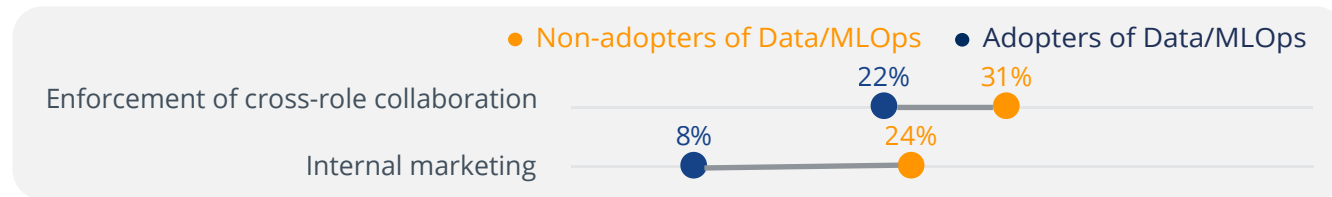
Factors that hinder benefits from ML, by Data/MLOps adoption status (n=228)

of Data/MLOps tend to be more concerned with technical and specialist-related matters than on communication in the wider enterprise context.

This is also reflected by several preventing factors that were cited by adopters more often than anyone else. In this respect, not being able to communicate the ROI of projects to stakeholders can be interpreted as a major skill gap. Likewise, a failure of stakeholders to fully understand the

purpose of ML projects can be problematic. In either case, this increases the risk that important projects will fail or not be authorized in the first place due to a lack of acceptance and consent.

Companies where the majority of employees lack a basic understanding of the opportunities and possibilities of advanced analytics also have a hard time establishing sustainable strategies for digital transformation because this lack of information usually manifests itself in resistance against new approaches. The adoption of DataOps/MLOps should therefore always be embedded in a company-wide initiative to generally increase data literacy and establish a data culture across the organization.



Comparison of effective measures by ML practitioners, by DataOps/MLOps adoption status (n=102)

DEMOGRAPHICS

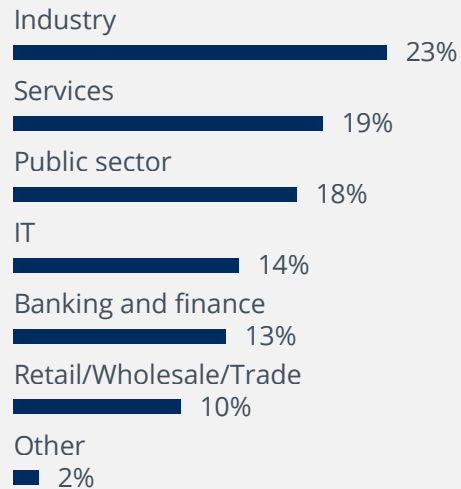


COMPANY SIZE



How many employees does your company have?
(n=248)

INDUSTRY SECTOR

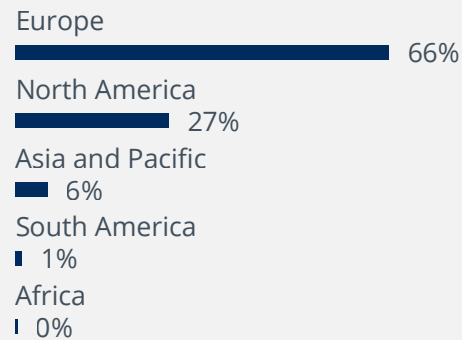


Which of the following best describes your organization's industry sector? (n=248)

OVERVIEW

This study is based on a worldwide online survey conducted from February to March 2022. We promoted the survey to the BARC panel and via our diverse communication channels. The majority of participants are from Europe. They represent companies of different sizes and various industries, as well as diverse approaches and levels of progress in the application of ML.

REGION



In which region are you located? (n=163)



DEMOGRAPHICS

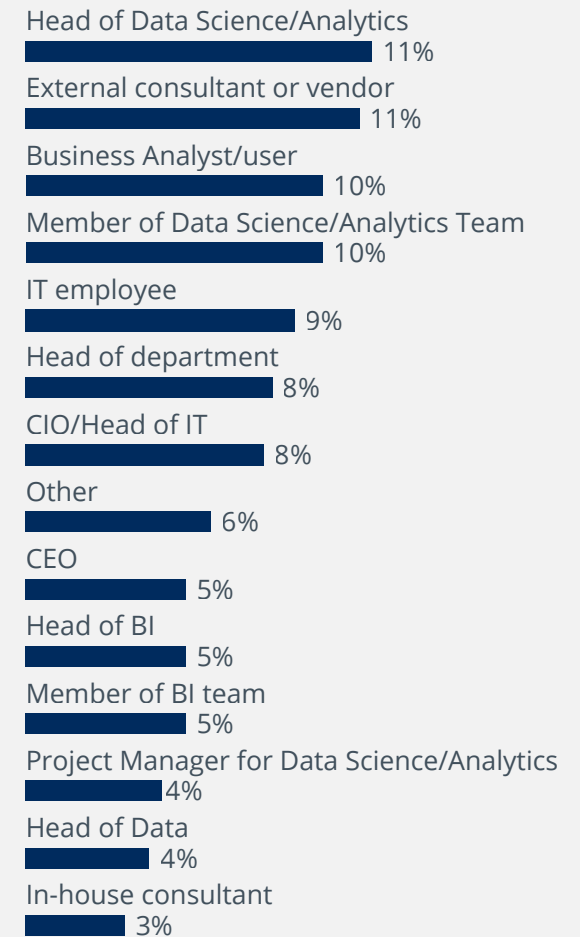


WHAT DATA DID WE USE?

After quality assurance and data cleansing, our sample contains data from 248 survey completions. Company sizes ranging from “less than 500” to “5,000 or more” employees are evenly represented and come from a range of industry sectors.

The respondents hold a variety of positions in their companies, as shown in the chart. Participants with a background in analytics, such as data science or business intelligence, account for the largest share. External consultants and vendors represent the second largest segment in the survey at 11 percent. Each of the respondents in this group completed the questionnaire on behalf of one of their customers.

POSITION IN THE COMPANY



What is your role in the company? (n=248)



BARC – MAKING DIGITAL LEADERS

BARC – BUSINESS APPLICATION RESEARCH CENTER

BARC (Business Application Research Center) is one of Europe's leading analyst firms for business software, focusing on the areas of data, business intelligence (BI) and analytics, enterprise content management (ECM), customer relationship management (CRM) and enterprise resource planning (ERP).

Our passion is to help organizations become digital companies of tomorrow. We do this by using technology to rethink the world, trusting data-based decisions and optimizing and digitalizing processes. It's about finding the right tools and using them in a way that gives your company the best possible advantage.

This unique blend of knowledge, exchange of information and independence distinguishes our services in the areas of research, events and consulting.

Research

Our BARC studies are based on internal market research, software tests and analyst comments, giving you the security to make the right decisions.

Our independent research brings market developments into clear focus, puts software and vendors through their paces and gives users a place to express their opinions.

Events

Decision-makers and IT industry leaders come together at BARC events. BARC seminars in small groups, online webinars and conferences with more than 1,000 participants annually all offer inspiration and interactivity. Through exchange with peers and an overview of current trends and market developments, you will receive new impetus to drive your business forward.

Consulting

In confidential expert workshops, coaching and in-house consultations, we transform the needs of your company into future-proof decisions. We provide you with successful, holistic concepts that enable you to use the right information correctly. Our project support covers all stages of the successful use of software.



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SPONSOR PROFILE: DATAROBOT

ABOUT DATAROBOT

DataRobot AI Cloud is the next generation of AI. DataRobot's AI Cloud vision is to bring together all data types, all users, and all environments to deliver critical business insights for every organization. DataRobot is trusted by global customers across industries, including a third of the Fortune 50, delivering over a trillion predictions for leading companies around the world.

DataRobot also offers DataRobot AI Cloud for Industries, an extension of our AI Cloud platform with unique capabilities and expertise tailored to address growth, risk and scale needs across major industries. DataRobot has delivered more than one million active customer projects for organizations like Mars, McLaren Racing, and Lenovo, resulting in a vast library of best practices for applying AI to enhance patient care, supply chain management, fraud detection and more. DataRobot AI Cloud for Industries extends this expertise to accelerate the impact of AI for all banking, retail, manufacturing and healthcare organizations.

DataRobot AI Cloud is built for every organization across any industry. From government, commercial, to non-profit organizations around the world, and has helped organizations across industries harness the transformational power of AI. From restoring supply chain resiliency to accelerating the treatment and prevention of countless diseases to combating climate change, all while jumpstarting innovation to power economies.

Learn more at datarobot.com.

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SPONSOR PROFILE: DOMINO DATA LAB

ABOUT DOMINO DATA LAB

Domino powers model-driven businesses with its leading Enterprise MLOps platform that accelerates the development and deployment of data science work while increasing collaboration and governance. More than 20 percent of the Fortune 100 count on Domino to help scale data science, turning it into a competitive advantage. Founded in 2013, Domino is backed by Sequoia Capital and other leading investors.



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SPONSOR PROFILE: ONE LOGIC

ABOUT ONE LOGIC

Founded in 2013, ONE LOGIC is a leading company in the use of artificial intelligence (AI) with turnkey data products (end-to-end applications). With extensive experience in data science projects, ONE LOGIC is an expert in tackling industry-specific challenges with targeted solutions. The company's aim is to enable its customers to monetize their data quickly and sustainably, digitize their business models, and independently generate added value. It does so through a unique combination of turnkey data products that turn data into long-term corporate assets and expert support from experienced data science and AI specialists. This paves the way for users at any stage of their business journey to develop high-quality, productive and scalable data products and innovative business models that create value—and to do so at a much more rapid pace.

Our enabling technology for this is ONE DATA Cartography. This automates processes and consistently creates the perfect conditions for using data by merging heterogenous data sources via AI. ONE LOGIC also offers turnkey data products

which analyze and link data sources via AI to meet the biggest challenges faced by companies today.

As an agile provider of AI-based data products, ONE LOGIC draws on the latest machine learning, deep learning, and AI technologies and algorithms. It also fosters partnerships with companies and universities to pursue the intensive research and development of innovative data products. Our goal? To help companies rapidly and comprehensively digitalize. Sustainability is always a top priority. At ONE LOGIC, we draw on our vast expertise in data science to create efficient data products that add tangible value and make a pervasive impact in business and society.

An owner-managed company, ONE LOGIC's executive board consists of company founder Dr. Andreas Böhm, Dr. Stefan Roskos, Christian Aumüller and Prof. Dr. Andreas Peifer (ppa.). As of April 2022, the workforce is almost 300 strong and still growing, with teams based at ONE LOGIC offices in Passau, Munich, Frankfurt, and Zurich. Our sights are primarily set on the manufacturing, automotive, retail, and pharma and biotech industries.



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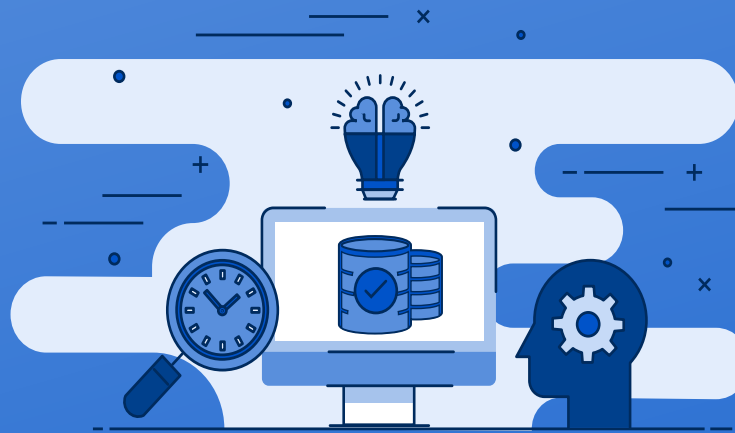
ALEXANDER RODE
DATA & ANALYTICS ANALYST / DATA
SCIENTIST

Alexander Rode is an Analyst for Data & Analytics and Data Scientist at the Business Application Research Center (BARC). He advises companies on use case identification for data analysis and tool selection for advanced analytics as well as conducting proofs of concept in the area of advanced analytics and data science coaching. Alexander also supports the preparation of BARC market studies and research articles, speaks at conferences and conducts BARC and in-house seminars.



TIMM GROSSER
SENIOR ANALYST

As a senior analyst, Timm Grosser has been advising domestic and international companies of various sizes and industries in the areas of BI, data management and analytics for more than 10 years. During his time as a consultant, he has designed numerous solutions in BI/big data strategy, organization, architecture and tool selection with customers and in the BARC test lab. He is a frequent speaker at conferences and seminars as well as the author of numerous industry articles and market studies.



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