

# Scaling-Up Data-Driven Pilot Projects

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■ *Conducting pilot projects are a common approach among organizations to test and evaluate new technology. A pilot project is often conducted to remove uncertainties from a large-scale project and should be limited in time and scope. Nowadays, several organizations are testing and evaluating artificial intelligence techniques and more advanced forms of analytics via pilot projects. Unfortunately, many organizations are experiencing problems in scaling-up the findings from pilot projects to the rest of the organization. Hence, results from pilot projects become siloed with limited business value. In this article, we present an overview of barriers for conducting and scaling-up data-driven pilot projects. Lack of senior management support is a frequently mentioned top barrier in the literature. In response to this, we present our recommendations on what type of activities can be performed, to increase the chances of getting a positive response from senior management regarding scaling-up the usage of artificial intelligence and advanced analytics within an organization.*

Nowadays, many organizations try to use artificial intelligence (AI) and advanced analytics on their data to gain competitive business advantages. *Analytics* is an umbrella term that can be described as “the scientific process of transforming data into insight for making better decisions” (Boyd, 2012). Sharma, Mithas, and Kankanhalli (2014) proposed a similar description of analytics and divided the process into three stages: data to insights; insight to decision; and decision to value.

During an analytics process, tools and techniques from AI play a key role when analyzing data. Delen and Ram (2018) provide a simple taxonomy of analytics and divide analytics

into three main categories: descriptive, predictive, and prescriptive. Descriptive analytics investigates what has happened in the past; a traditional business intelligence solution with a data warehouse is an example of descriptive analytics. Predictive analytics investigates what will happen in the near future, typically by using solutions based on data mining and machine learning. Finally, prescriptive analytics investigates decision recommendations, for example by the aid of decision trees. Predictive analytics and prescriptive analytics are grouped together under the term *advanced analytics* and rely on tools and techniques from AI for analyzing data.

In our experience, pilot projects in AI and pilot projects in advanced analytics share many similarities. They both use AI techniques for analyzing large volumes of data, with intentions to discover new patterns and characteristics that could lead to new business insights. Pilot projects in advanced analytics tend to involve the business side more frequently than similar AI projects. In contrast, automated decisions tend to be more frequent in the AI projects that we have come across. However, the distinction between the two types is subtle. We have also come across real situations where projects have started as a project in advanced analytics and then moved on and were transformed into an AI project. For the purpose of this article, we group both types of pilot projects under the banner of data-driven pilot projects, because they both use AI techniques to analyze large volumes of data for making better decisions.

Smith and Eckroth (2017) analyzed nearly 30 Innovative Applications of Artificial Intelligence conferences, and together with personal experiences they developed a checklist for builders of future AI applications: Select problems with a solid business case; minimize changes required in existing workflows; identify domain- or task-specific knowledge and data for the problem; select appropriate knowledge representations and data sources; develop knowledge and data acquisition and maintenance plans; select appropriate reasoning/learning strategies; develop a set of test cases and performance metrics; add safeguards and opt-out capabilities; and test with real data from users or operating environment.

Given this checklist, and the increasing public interest in AI, the commercially available tools and platforms, and the highly skilled data scientists being hired by organizations, it should be a “piece of cake” to develop a pilot project and scale it up. In practice, many organizations still struggle to get past the pilot stage.

To get some initial knowledge on whether AI and advanced analytics will generate any business value, several organizations launch pilot projects. However, simply launching random pilot projects in AI and advanced analytics is not a suitable approach. Forbes Insights and EY (2015) recently reported that organizations that are in the early stages of their journey, tend to have several pilot projects in AI and advanced

analytics running in parallel without much awareness of each other’s existence. In this situation, findings are not shared between pilots, and there is a risk of redundancy among the pilot projects. Furthermore, Bisson, Hall, McCarthy, and Rifai (2018) reported about a company that ran more than 50 pilots with the aid of a large group of data scientists. In the end, the business side adopted few of the findings from the pilot projects. From our own experience of running pilot projects, we have noticed that there is sometimes an internal power struggle among different parts of the organization that want to take control of the hot AI topic. Again, there is a major risk of redundancy, and other negative effects.

To take the next step, and increase the usage of AI and advanced analytics within the entire organization, a bigger and aligned initiative needs to be launched—an initiative that needs funding and approval from senior management. Unfortunately, lack of senior management support is a frequently mentioned top barrier for scaling-up pilot projects (Halper and Stodder 2017; LaValle et al. 2011). Hence, many scale-up attempts receive a negative response from senior management.

In this article, we present an overview of barriers for conducting and scaling-up data-driven pilot projects. Finally, we present our recommendations on what type of activities can be performed, to increase the chances of getting a positive response from senior management regarding scaling-up the usage of AI and advanced analytics.

## Barriers

Barriers to implementing advanced analytics have previously been reported in the literature (Berndtsson, Lennerholt, Svahn, and Larsson 2020; Halper and Stodder 2017; LaValle et al. 2011; NewVantagePartners 2019). In this section, we draw upon our own experiences and related literature for presenting a sample of barriers that can appear in a data-driven pilot project. Figure 1 presents an overview of the barriers.

### Visible Barriers before Pilot Launch

Barriers that are visible before a pilot project is launched are: unfocused project; unrealistic expectations; unbalanced team; lack of skills; and high dependency on key person.

#### Unfocused Project

Some organizations feel the pressure of making progress in AI and advanced analytics without having any clearly defined business needs. Assume that an organization wants to understand what AI and analytics can do for them, and how they can benefit from new tools and techniques, to motivate a large-scale project. It is tempting to start a pilot project just to explore current techniques, algorithms, or ideas, and see what comes out of the project. However, this is rarely a good approach without a business question tied to the aim of the pilot project. In the end, it may even backfire into a lack of

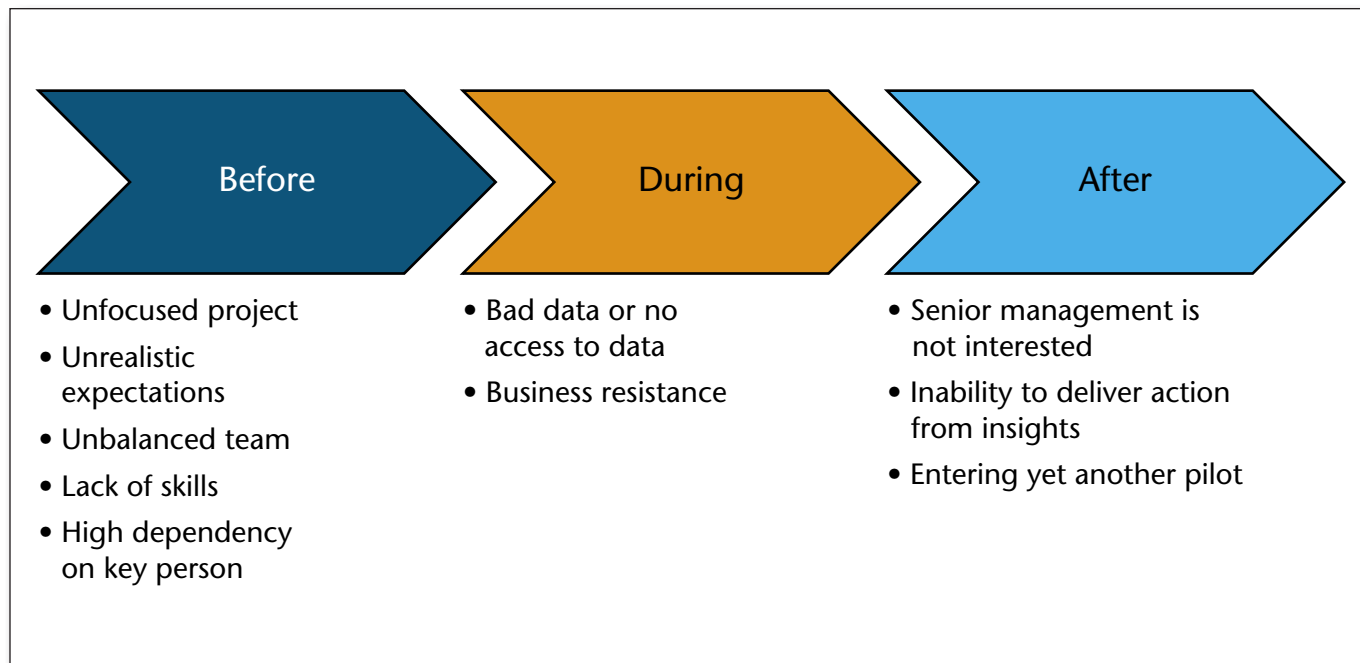


Figure 1. Potential Barriers That Can Appear in Data-Driven Pilot Projects.

trust for AI and advanced analytics in the organization, and delay any progress in the area for several years.

#### Unrealistic Expectations

AI and advanced analytics often have a shimmer of silver bullet or magic about it. For example: *Once we get this AI platform up and running, we will be able to predict our customers' behavior for the next two months with 80% accuracy.* Probably not. Only promise what you are sure you can deliver.

#### Unbalanced Team

The configuration of who is part of the pilot can quickly become sensitive. A common approach is to have a team set up that has mostly members that are highly technically skilled. Business representatives are few or absent. Such a team configuration will be criticized by the business side as yet another technical project, one that does not understand how business value is created. Similarly, a team mostly based on people from the business side runs the risk of performing naive analytics on bad data, common reasons being that business people lack the necessary technical skills to perform advanced analytics and access (and integrate) good data.

#### Lack of Skills

Many organizations have in-house skills in database administration, programming, and software engineering. These skills can be used to tackle most technical pilot projects within computer science. However, these skills cannot easily be reused for a pilot project in AI and advanced analytics because the required skills and techniques are different.

#### High Dependency on Key Person

In small- to medium-sized organizations, new and emerging techniques like AI and advanced analytics can be initiated by one or several key persons who are ready to put an extra effort into driving the entire agenda forward. Introducing a completely new field in an existing business is a difficult task, and if only one person is starting the work, it can be devastating for the progress if that person leaves the project.

#### Visible Barriers That Tend to Appear During Pilot

Barriers that tend to appear during a pilot project are bad data or no access to data; and business resistance.

#### Bad Data or No Access to Data

The list of potential barriers related to data are long and ever-present. In most situations, a data-driven pilot project will need access to data that has not been analyzed before, or that has not been previously collected. It is quite common that the organization believes they have access to more data, and better-quality data, than they actually do. Typically, the Information Technology (IT) unit controls access to collected data within an organization. A data-driven pilot is a first test if the IT unit is willing to shift focus from controlling access to data, to enable access to data. Self-service business intelligence is an area that is built upon the idea that business users to a large degree can access data sources and perform analytics on their own. In such an environment it is fundamental that the IT unit enables easy access to data. If not, the IT unit will be swamped with requests

from business users to provide data, as a consequence of an increasing number of businesspeople that start to use tools such as Power BI (Microsoft), Tableau (Tableau Software), and Qliktech (Qlik). It may also be the case that the semantics of data differ between business units in the same company. For example, the meaning of *customer* may differ among business units, because there are different types of customers. If this is the case, analyzing customers centrally will give false results and the amount of work required to harmonize semantics may be too much for the pilot to scale-up.

#### Business Resistance

A data-driven pilot project usually requires access to decision-makers, to develop a proper model for how decisions are currently made, or for benchmarking the results from the pilot. However, not all decision-makers within the organization are willing to share their knowledge with a pilot project that could potentially threaten both their job and power.

#### Barriers That Appear Once a Pilot Project has Finished

Senior management is not interested; inability to deliver action from insights; and entering yet another pilot project.

#### Senior Management Is Not Interested

Despite successfully completing a data-driven pilot project, senior management is not interested in scaling-up the pilot. The reasons for the lack of interest from senior management can be several. First of all, do not assume that senior management is up to date with what is meant by buzzwords like analytics, AI, or data-driven organizations. Results from advanced analytics have the potential to guide business leaders to make decisions based on data and algorithms, instead of experience and gut feeling. However, if the algorithms used to retrieve the results cannot be clearly explained and understood, which may be the case for machine learning algorithms, it may be hard for people to trust the results as a base for important decisions. If senior management does not trust the results from the pilot, it might be due to the fact that they do not understand the concepts or techniques that were used. Finally, senior management does not see how the pilot project fits into the bigger picture of the organization's future direction.

In practice, we have also seen examples of the opposite. Senior management and the board have all heard about this buzzword AI, launch large initiatives, and spend a lot of money without having a strategy and a real idea of what they want to achieve.

#### Inability to Deliver Action from Insights

The outcome of analyzing collected data should be a business insight. To get some real business value from a pilot project, action needs to be implemented as a response to the business insight. For example, assume that the analytics reveals business insights that sales of warm socks increase the

day before a local hockey derby in a certain state. That business insight, in combination with a dataset of persons who are interested in hockey in the same state, provides input to local marketing campaigns on warm socks. However, if we want to scale-up actions on insights beyond the pilot level (a certain state), and implement them on a larger scale (for example, other states), then it requires extensive knowledge and understanding of how the entire organization is built up. In such a scenario, an organization needs to have mechanisms in place for how to predict, optimize, and maintain appropriate stock levels in several states, or even countries. This is a large step from a pilot because it requires a joint commitment from business, IT, and management to deploy such a scale-up. Although an insight is available, the cost to scale-up the action might be too expensive or complex. Hence, the business insight and its action for delivering business value cannot be scaled-up beyond the pilot level.

#### Entering Yet Another Pilot Project

A data-driven pilot project is sometimes easier to start compared with a pilot project that will require a change in a business operation. The reason is that a data-driven pilot can be set up to bring real value to the business without altering anything in the existing line of operation or legacy systems. In its simplest form, all that is needed is to read already collected data as input to an analytics tool. Hence, a successful data-driven pilot project comes with a temptation to stay on the pilot level, without scaling-up the results to the rest of the organization. This is because the pilot project is already bringing in some business value to a business function, which makes it legitimate to keep it. As the pilot was successful, the next time a business problem appears, a similar pilot project is launched. In the end, such an organization will have lots of small data-driven projects for which the outcomes are not scaled-up to the rest of the organization.

## Checklist for Future Data-Driven Pilot Projects

In this section, we will present our checklist for running future data-driven pilot projects. Similar to the previously presented barriers, the checklist is based on personal experience of deployed pilot projects and supporting literature. The intention with the checklist is to increase the chances of getting a positive response from senior management regarding scaling-up the usage of AI and advanced analytics, and avoid becoming yet another pilot project that is not adopted by the business side.

#### Before Launching the Pilot Project

Before you launch a pilot project, you need: to ensure that a cross-functional team is in place; ensure that work has been done to focus the aim and scope; to have an initial understanding that the data is

available and of good quality; and to know that the pilot project is aligned to existing business strategies.

#### Build Cross-Functional Teams

Having cross-functional teams is good practice and recommended by the literature (Bisson et al. 2018; Kotter 2012). Analytics is a cross-functional exercise where skilled people from different parts of the organization are needed. At least four categories of team members are required, as shown in figure 2: IT people to ensure safe and correct data access; businesspeople that understand the business question and desired outcome; people specialized in the proposed analytics platform; and an analytics champion that understands the bigger picture of using analytics, and has an ability to understand and translate concerns raised by the other three member categories. An optional seat for middle management owning the business problem can be added.

If one of the four main categories of members is missing, you increase the risk of getting a pilot project that produces a silo solution with limited value. For example, if you bypass IT people, then you increase the risk of data-related pitfalls, such as not having access to real data or running the analytics on data that has wrong semantics. If you bypass the business side, you create resistance and frustration among the related businesspeople. They will claim that you have not fully understood the business problem, or that you cannot derive suitable business insights due to your lack of domain expertise. If you bypass analytical expertise, you run the risk of applying advanced analytics in a naive and incorrect manner. Cutting-edge competences within analytics can be expensive and hard to find. If there is no in-house analytical competence for the pilot project, you need to bring in external help. Finally, if you bypass an analytical champion, you lose someone who can see the bigger picture of why the usage of analytics needs to be adopted and scaled-up. Furthermore, without an analytics champion, the team loses someone that can understand and explain conflicting concerns raised between different business units.

Business resistance and lack of middle-manager adoption are two common top barriers to scaling-up. A cross-functional team of people, and the optional seat for middle management, can help to reduce resistance in adopting AI and advanced analytics in the organization.

#### Focus Scope and Aim

To focus the scope and aim of the pilot, you need to start with writing down what is the business question (or problem) you are going to investigate with the pilot project. Although obvious, it is important to try to formulate the business question (or problem) as clearly as possible (Rose, Berndtsson, Mathiason, and Larsson 2017). Similar to a thesis project or a research article, try to focus the aim of the pilot down to a single sentence. Keep in mind that a pilot investigates a specific business question and not a bigger scope of how AI can be used for Human Resources

(which is beyond a pilot project). Similarly, Smith and Eckroth (2017) highlighted the importance of having a solid business case before continuing with the analysis of the data.

AI and advanced analytics can, in theory, be applied to three different decision levels—operational, tactical, and strategic. To keep a pilot project focused, it should be restricted to one type of advanced analytics and one decision level; for example, using predictive analytics on the operational decision level for a given business question.

Finally, for a pilot project to be successful, it must be possible to measure the outcomes of the pilot. It must be stated beforehand when the pilot is supposed to be completed and have a clear definition of the metrics that define success or failure. Related to this, have realistic expectations on the outcomes of the pilot project. We have seen situations where senior management have had unrealistic expectations on the outcome of the pilot, simply due to rumors what AI and advanced analytics can potentially do. One aspect to consider is whether the scope of the pilot should include delivering business insight and implementing a potential action—or should only deliver business insight.

#### Understand the Organization's Status of Data and Its Quality

Data issues are one of the single biggest reasons why data-driven projects fail (Halper and Stodder 2017; Rose et al. 2017), and preparing data is the most time-consuming task in machine learning projects. Starting a pilot without an understanding of the quality or accessibility of the data needed is not advisable. Make sure that the level of data quality is understood at least on correctness, availability, and coverage criteria. If the data quality is bad, your pilot project will suffer because the quality of the results from the pilot project are directly correlated to data quality. Scaling-up a pilot built on poor quality data is not advisable and it may be hard to draw any conclusions from a pilot based on data that is bad or manipulated to cover for bad quality.

#### Align the Pilot Project to Business Strategies

Our experience is that few organizations have scale-up usage of AI and advanced analytics as their primary vision. Instead, AI and advanced analytics is used as the main mechanisms for supporting a more business-oriented vision. According to Anand and Barsoux (2017), most change transformations in organizations can be derived from five underpinning quests: global presence, customer focus, nimbleness, innovation, and sustainability. Our assumption is that AI and advanced analytics can be applied to any of these five transformation directions. Even if AI and advanced analytics is not explicitly part of the business strategy, ensuring implicit alignment to some part of the organization's overall strategy is crucial for the pilot to scale-up. Showing how the pilot will contribute to some or all of the organization's goals will put the pilot in a greater context and



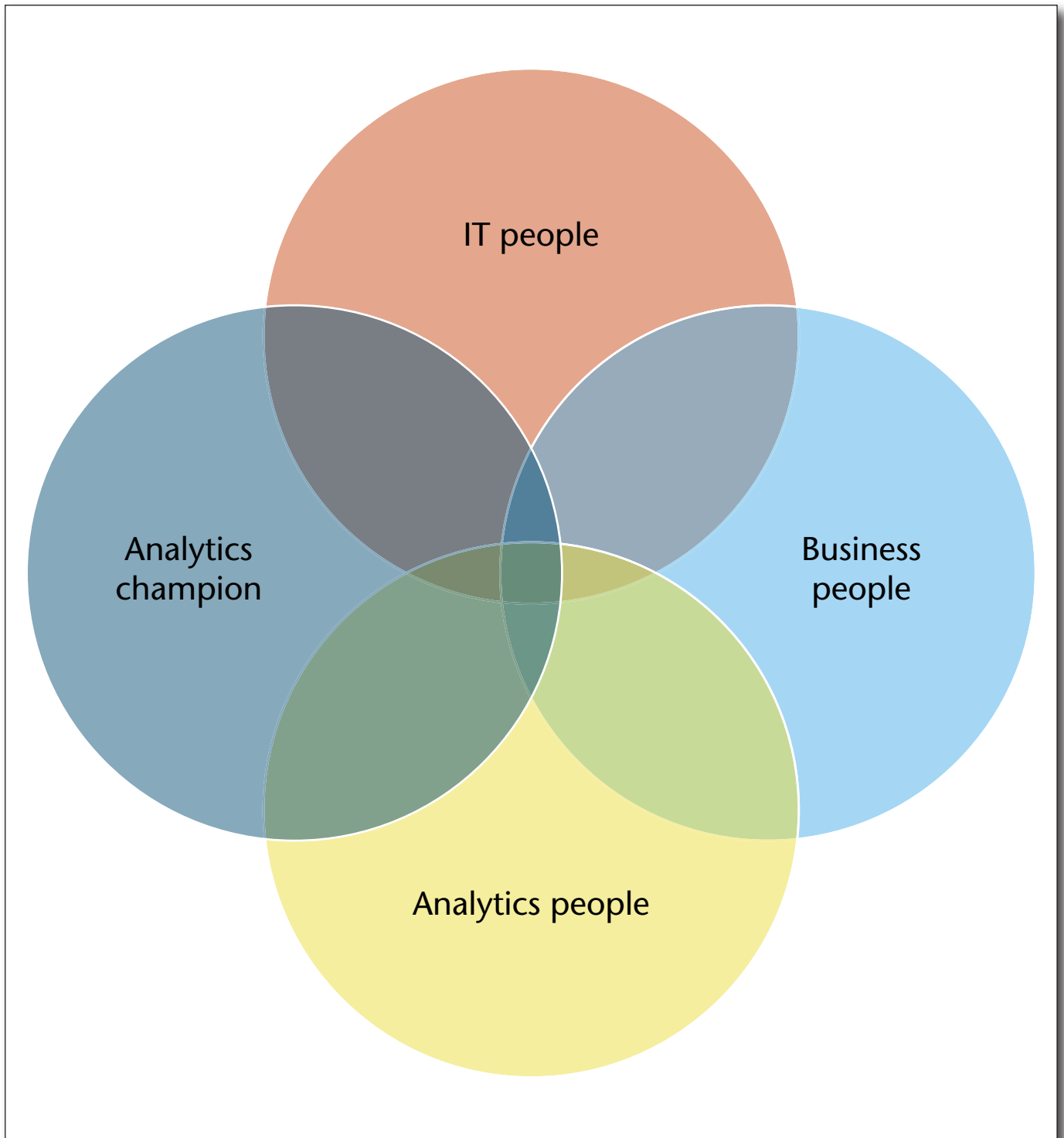


Figure 2. Cross-Functional Team for Data-Driven Pilot Projects.

will likely improve both focus and management support (Franks 2014; Bisson et al. 2018).

#### During the Pilot Project

Data-driven pilot projects have the same need for sound project management as any other pilot

or project. However, we will pinpoint some areas where we believe that data-driven pilots require extra focus to avoid common pitfalls.

#### Address Data Quality Early

As previously described, data-quality issues are a major risk for any project, and this is especially true

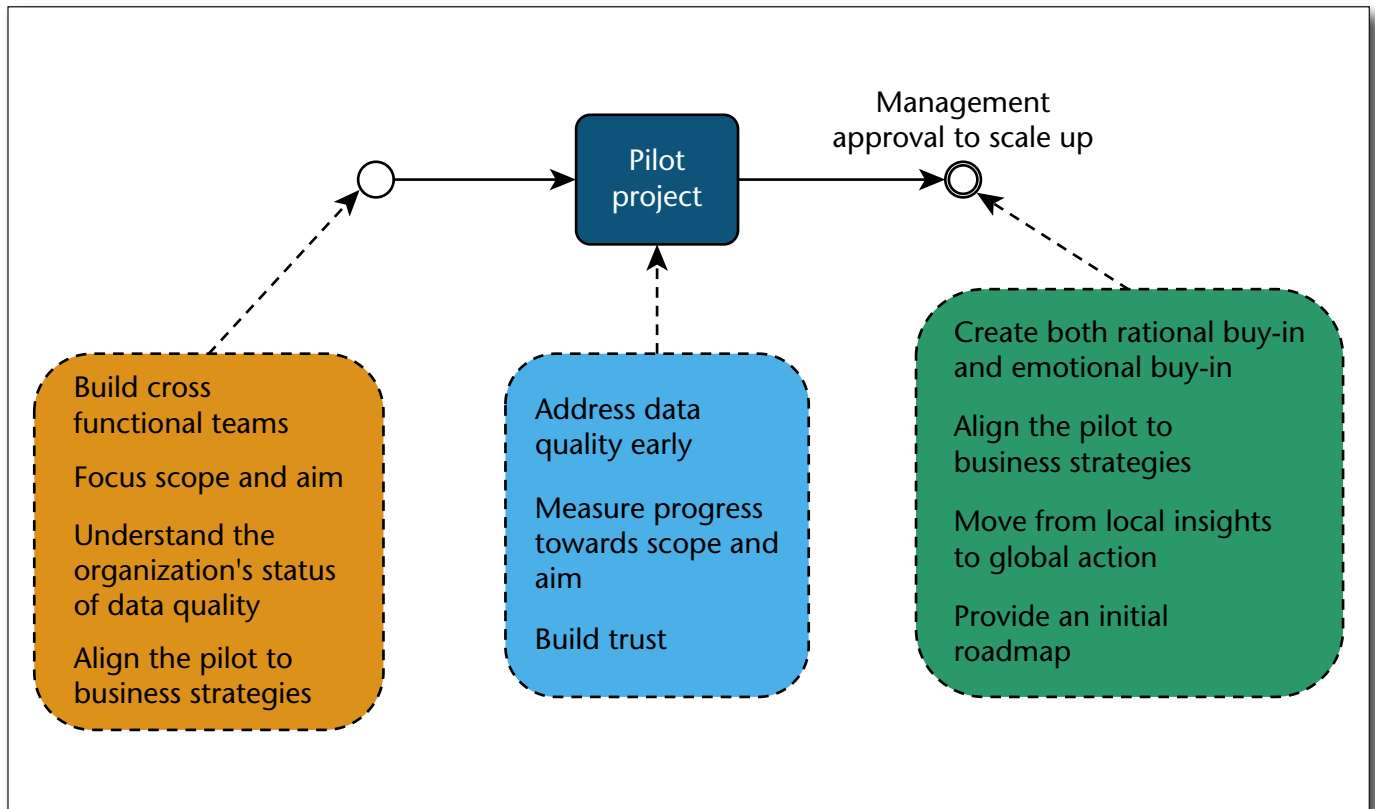


Figure 3. Recipe for Successful Data-Driven Pilot Projects.

for data-driven pilot projects. Take care of this risk as early as possible to mitigate the risk of failing the pilot due to data-quality issues (Rose et al. 2017). If data-quality issues are severe, then do not start the pilot at all without explaining this issue and the attached risks to the pilot’s sponsor. We have seen pilot projects that were severely delayed due to bad data quality that had to be corrected. Furthermore, we have come across several situations where organizations wrongly assume that having a data warehouse in place is a guarantee of having good data for performing advanced analytics.

**Measure Progress toward Scope and Aim**

Make sure that there are defined and agreed milestones and that the pilot is delivering on the milestones. The risk of scope creep is high when people start to understand what AI and advanced analytics can do, and new requirements are added to the pilot after project launch. This does not imply a waterfall methodology, where all requirements are fixed from the start and never updated. It means that a pilot must have a clear goal, and if that goal for some reason changes, then it is a deliberate change of scope and target.

**Build Trust**

For uninitiated people, there might be a shimmer of magic over how algorithms are created, and results produced in AI and advanced analytics. As a result,

a pilot can encounter both business resistance (not trusting or understanding techniques or produced results) and business overconfidence (always trusting or exaggerating produced results). To bring these two categories closer to the truth, you need to involve the stakeholders and build trust by explaining how results were produced, explaining techniques, demonstrating that results are reliable, and explaining the accuracy of results (Rose et al. 2017). Do not run the pilot as an isolated project with no insights from anyone until the day of the final presentation.

**Scaling-Up**

The pilot is finished. Next step, getting approval from senior management to scale-up usage of AI and advanced analytics. Below are our recommendations on what to consider when you intend to approach senior management.

**Create both Rational and Emotional Buy-In**

Keep in mind that your request for further funding is competing for resources with other items/projects on the agenda for senior management. To increase your chances of getting approval, follow the advice from Cohen (2005) and Kotter (2012) and create both rational buy-in and emotional buy-in for the outcomes of your pilot project. Rational buy-in is easier to create than emotional buy-in. Rational buy-in from a pilot project can be in the form

of figures showing reduced time-waste/cost and increased margin-accuracy/profit. When it comes to emotional buy-in, you need to have senior management visually experience the problem, the expected findings from the pilot project, and the potential benefits from scaling-up usage of AI and advanced analytics.

#### Align the Pilot to Business Strategies

Put the pilot in a greater context and describe how the pilot will contribute to some or all of the organization's goals (Bisson et al. 2018; Franks 2014). If possible, join forces with other pilot projects, and demonstrate that AI and advanced analytics can be applied to other areas/units within the organization.

#### Move from Local Insights to Global Action

Business insights and their associated actions that are developed during a pilot project are limited to the scope of the pilot. Scaling-up insights and actions from a pilot on a wider scale is in most situations an organizational journey, rather than a technical journey. A scale-up may imply changes to several areas, such as data governance; how people make decisions and are trained; types of analytical tools that are used; and the ways in which IT enables easy access to data. Although these are examples of changes that are beyond the scope of a single pilot project, a pilot project can contribute to start moving the organization in the right direction.

#### Provide an Initial Roadmap

If you have applied for a scale-up of AI and advanced analytics, then you need to provide an initial roadmap on what you intend to do. Such a roadmap can include steps such as invite a guest-lecture, visit another organization, collaborate with universities, and let a cross-functional team develop a first draft of vision and supporting strategies (both technical and nontechnical). Do not fall for the pitfall and only develop technical strategies. This is a shortcut that, in the long run, will require that you also develop strategies for how the business side should use and adopt a data-driven approach to decision-making (Berndtsson et al. 2020).

#### Summary

Figure 3 summarizes what type of activities you can perform before, during, and after a data-driven pilot project. Based upon our experience and related literature, these activities can increase your chances of getting an approval to scale-up a data-driven pilot project.

## Conclusion

We have in this article complemented the checklist of Smith and Eckroth (2017), by providing a checklist for future data-driven pilot projects. Our checklist puts special emphasis on how to increase the chances of getting a positive response from senior management regarding scaling-up the usage of AI and advanced analytics.

Our recommendations are based on lessons learned through deploying data-driven pilot projects, and attempts made by organizations to scale-up the usage of AI and advanced analytics beyond a pilot project. By sharing our lessons learned, we hope that other organizations will avoid some of the barriers that we encountered.


Recommendations such as building cross-functional teams, creating both rational buy-in and emotional buy-in, building trust, and having business strategies in place, are all related to best practices within the change management area. The usage of change management in our work is motivated by the high frequency of business resistance that has been previously reported in the literature. Data-driven pilot projects are likely to encounter business resistance from all decision levels: senior managers, middle managers, and people making operational decisions in business and IT. Furthermore, scaling-up the usage of AI and advanced analytics within an organization has the potential to change the entire decision culture in the organization. People on all levels can have concerns about how new technology will affect their daily work, salaries, benefits, and decision power. Hence, methods and techniques from change management are used at the pilot project stage to reduce business resistance.

In a bigger picture, the checklist for running data-driven pilot projects can be seen as a first initial step in a systematic process for moving toward a data-driven organization. We are currently in the initial phases of developing such a systematic process. Preliminary results indicate that change management, conceptual analytical frameworks, and a new leadership style are important components.

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