

TASK **1**

The Problem

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SOLVE THE RIGHT PROBLEM

My friend Polly Mitchell-Guthrie, an analytics thought leader and senior executive at Kinaxis, likes to say, “Whatever else you do, don’t solve the wrong problem.” She is absolutely right! This is actually what scientists call a *type III error*,¹ finding the right answer to the wrong question (curious about type I and type II errors? See Task: 5 Execution for more). Finding and solving a valuable, worthwhile, and impactful problem in which you can actually succeed is the critical first task, maybe even the most important one, and not as easy as many think.

You can succeed in many low-value analytics projects and still fail in your business. Not every problem that can be solved is worth solving, nor is every problem worth solving amenable to an analytics solution. There are many high-value analytics problem areas out there and too little time, talent, and resources to address the important ones, let alone the low-value ones.

Successfully making a difference with analytics means focusing on finding, screening, prioritizing, and solving the most important and achievable analytics problems for your organization. Our experts agreed that Pareto’s 80/20 rule applies here: 20% of solvable problems that come your way will yield about 80% of the value, and the rest should be deprioritized. The unsolvable problems should be handed off to be managed another way.

Knowing where to find the right analytics opportunities for your organization, at the right time, making sure they are solvable, and then prioritizing which to do when and which not to do is absolutely key to analytics success. There are many factors to consider in this process. Perhaps the first should be identifying what approach to analytics is right for you, your project, and your organization at this time.

That thought process begins with a discussion of the DAD (decision-centric, action-centric, and data-centric) analytics framework, which is designed to help executives, business process owners, and other leaders understand the approaches they can take to analytics, to know how these approaches interact with each other, and, importantly, to stay focused on action, which is needed to realize value. Next, we look at best practices for each approach and their synergies. Then, we learn how to screen potential projects for viability by ascertaining if a project is amenable to an analytics solution, that is, if analytics is likely to be able to help solve that problem. Finally, we learn best practices in prioritizing viable projects.

THE DAD FRAMEWORK FOR ANALYTICS ACTION

I believe the *a* in analytics should stand for action. Value is realized only when actions are taken, and it is well understood that analytics can help determine the best actions to take. But what is less understood is that analytics can, and should, also be used to

ensure that those actions are taken and to then monitor their impact. Identifying how and where to take those actions is only half the value; executing on them and learning from them is also essential.

The DAD framework was developed to help guide that process, to remind us that it is not just about making better decisions but taking action on them, and analytics can assist there, too. This framework reminds us we can use action-centric analytics to ensure action is taken and to change the culture through organizational learning, which is the key to sustainable analytics success.

Which of these three broad approaches to analytics—decision centric, data centric, and action centric—is determined by the specific situation. In the DAD framework, decision-centric and data-centric analytics both point to action-centric analytics as the primary goal; hence, action is in the center of this framework, as shown in Figure 1.1.

There are valuable problems best solved with each type or approach. Executives must learn to recognize which approach is best for each time and place in their organization. Although each approach has value on its own, when they are used together they create synergies that can drive organizational learning. However, leaders must recognize that action-centric analytics is an important tool for accelerating organizational learning at scale and is especially effective when coupled with leadership.

Approach Interactions and Examples

Because we briefly introduced each approach to analytics with Task 0: Analytics Leadership, we start with a highly simplified example of each approach from when I was chief analytics officer for HiveTracks. At HiveTracks, we aimed to use all three approaches to analytics and benefited from them interacting synergistically as we moved between approaches, applying what we learned from each one. Afterwards, we will provide more context, theoretical support, and examples for each to fill out the details so you can see them in action.

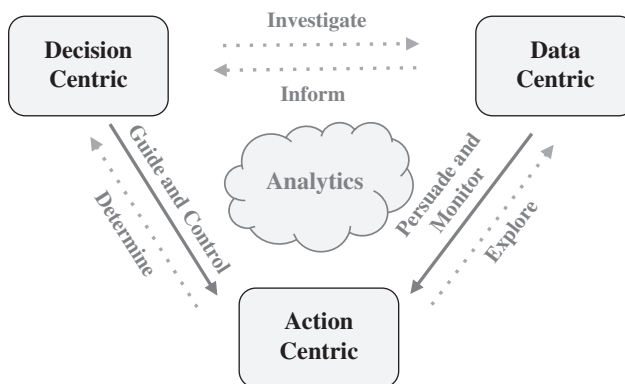


Figure 1.1 The DAD Framework for Analytics Action

Data-Centric Example: HiveTracks

One of our first tasks was to look at the data we had and search for value. After testing several ideas to add value with the data, we identified community intelligence as an important approach that aligned with our strategy and values. Under this model, we realized that data from other beekeepers, the actions they were taking, and the ecosystems they were observing, such as flowering blooms and native pollinators, would be very useful. The data could be processed, digested, and visualized for beekeepers and organizations to improve bee health and monitor environmental health and biodiversity impact. It could prove to be particularly useful across the Global South, as Max Rünzel posted in a blog about using AI-driven climate-smart beekeeping to support rural women in Ethiopia and Uzbekistan.²

We had some of this data already, enough to prove the concept and its value. However, to really scale, we needed more reliable and consistent data and more expansion of what we were collecting. We knew that community intelligence has the potential to demonstrate the value in data beyond the individual, starting a virtuous circle that allows for crowdsourcing environmental data to monitor biodiversity. In addition, beekeepers have been relying on local groups, mentors, and associations to compare and learn from their practices. Digitally supporting these relationships was a recurring need expressed by many beekeepers, particularly vis-à-vis an overall deterioration in bee health and more extreme climatic events. We turned to action-centric analytics to encourage participation and enhance relevant data collection for community intelligence and use of it.

Action-Centric Example: HiveTracks

The data-centric approach validated the value of some of the data we had to others outside the company and pointed to additional data that would expand and enrich the value. The next step was to collect and improve it. Some data were relatively easy to add, such as weather data. Others required much more customer support and engagement. We needed to identify what we could do to encourage, nudge, or drive our users to share high-quality data regularly to maximize the value derived from it for the local beekeeper community.

We first looked at existing academic theories to see what drives the desired action. In this case it was adoption and use. We identified and adapted a theory as a starting point to drive action the technology acceptance model,³ which has been validated, with various permutations, many times since the 1990s, including a few times by me!

The theory holds there are two core factors that influence the adoption of technology. These (simplified) factors are how easy it is to use and how useful it is. Other factors, such as enjoyment (technically called *hedonic factors*), privacy risk, and others can also matter. We knew that our environment, an apiary with bees flying around, as well as sticky honey or propolis getting on fingers and devices, made it hazardous for using a smartphone to input images taken and data gathered from hive inspections. So we adapted and tested the theory, using actual data use from the application.

As a result, we were able to identify key factors that were and were not being used on the web and in the application and how they related to actual use. Oh, and yes, being in a hazardous environment also played a role. We even published a peer-reviewed journal article⁴ about the findings, going full circle and extending the theory for others to build on it. We wanted to give back and imagined that firefighters, soldiers, and others might have similar hazardous places where this construct was important and we wanted to share it with the world.

Using these and related insights, a complete redesign of the application was done, with leadership from CEO Max Rünzel, cofounder Dr. James Wilkes, and others. Preliminary feedback has been excellent.

Decision-Centric Example: HiveTracks

First, we explored our data, looking for what could be done with it to create value (data centric). Then we focused on actions to increase and leverage that value (action centric). The next step involved using decision-centric analytics because our goal was to decide what practices to recommend to our users. The following is one small example of many we took that worked together to encourage action.

We partnered with some contacts, now friends, affiliated with the United Nations Food and Agriculture Organization (UN FAO), headquartered in Rome. They had a set of best practices in beekeeping in which their expert network had already identified recommendations. Our task was to validate, and then hopefully adopt, these practices. Because most of these practices were based on either local experiments or theory, field testing them, at scale, was critical.

Fortunately, because we already had data from users around the world, we were in a position to do some of this testing. We selected the United States as our site because it was a large country with diverse climates, and we had enough data that we could use five-plus years of historical data for a broad analysis, smoothing out seasonal variations. We were able to validate best practices for hive inspections with a few interesting and surprising results that will likely lead to updates in theory. Another peer-reviewed article has been accepted for publication, enabling us to give knowledge back to the community, and should be in print about the same time as this book.

The point is that we used all three approaches to analytics at HiveTracks, and we received significant value from the synergies among them. There was no particular reason that data-centric analytics needed to be first. We could have also started with another analytics-centric approach to create value. Ideally there will be a place for all three, but even two is better than just one approach. The important point is to fit these approaches to your organizational needs.

For example:

- **Decision to data centric.** If you have a decision, you can use a data-centric approach to investigate creative, out-of-the-box solutions, beyond what has been tried before, to find a possible answer.

- **Data to decision centric.** If you find something interesting in the data, or have an idea for what could be done with the data you have, it can inform possible decisions, suggesting other approaches.
- **Decision to action centric.** If you have a decision to make, this approach can guide or even control the appropriate action. This line in Figure 1.1 has a solid arrow because it is a more common, stronger, and more intuitive approach than approaches with the dotted arrows.
- **Action to decision centric.** If there is an action you need to encourage or enforce, you might use decision-centric analytics to determine if it is having the desired effect or which approaches or practices may perform better.
- **Data to action centric.** If you find something interesting, you can use analytics to help persuade people to take action and monitor the impact of those actions to sustain engagement and adjust as needed. This line also appears as a solid arrow in Figure 1.1 because this is a more common, stronger, and more intuitive approach.
- **Action to data centric.** If you have an action that needs to be taken, you may use a data-centric approach to explore various possibilities and suggest the best ways to guide it.

All of these approaches work together, but the primary focus should always be on action. Solving a problem might be fun, but unless action is taken it will have little impact. The DAD framework is designed to help you think about the various approaches to analytics, identify possible problems in your organization that each approach could address, and help you plan how they can all work together to drive action on valuable problems.

Now that we have seen each approach in action, let us go into a little more detail.

Decision-Centric Analytics

Decision-centric analytics is centered on the decision. The focus is on taking a known problem or decision important to the organization and improving that decision with analytics. You might think of this as a problem looking for data to solve it. It is the classic and most well-known approach to analytics.

My team and I used another decision-centric approach when working on projects for the power industry. The goal was to predict when energy consumption would peak or reach its highest point. This energy was (1) the most expensive the utility could purchase because of high demand charges, making it as much as 2000% more per KWh during that time, and (2) the least sustainable energy as all types of energy generations were mostly used to meet demand, even the most environmentally damaging.

The demand forecast was highly dependent on weather, among other factors. We built a decision-tree-based algorithm that predicted when peak demand would be, more than 24 hours in advance, with more than 90% accuracy. This approach enabled

the utility time to shift demand, saving dollars and reducing the environmental impact, while improving the load management decisions they needed to make every day.

For most business leaders, decision-centric analytics is the first, maybe the only, type of analytics they think about. When they have a problem, they want someone to help them solve it, whatever the problem is, and analytics professionals are the ones they call. This approach has the advantage of a clear ROI because it is focused on a known problem with identified value to the organization. It generally follows a formal methodology or process for solving problems through a logical, repeatable process. Organizations can get quite good at following this process and, with the focus on known problems, the odds of success are quite high.

Its downside is that it has a short-term focus on current problems that can be solved quickly, which means it often misses new, out-of-the-box or game-changing opportunities to do something differently.

Analytics professionals with a business orientation, discussed in Task 2: Teams, tend to do particularly well with the approach.

Data-Centric Analytics

Data-centric analytics is centered on the data. The focus is on taking known data and looking for an interesting problem it might be able to solve. You might think of it as data looking for a problem, when someone has an idea and validates it for doing something interesting you were not necessarily looking for, but provides a lot of potential value.

For example, my friend, Libor Cech, former CEO of Chemoprojekt, with decades of experience applying analytics and automation in natural resource industries in Europe and the United States, used this approach in the lumber industry.⁵ Cech saw that daily lumber price data was becoming available for different dimensions and grades of lumber and that data from new scanning technology, similar to an x-ray or magnetic resonance imaging for logs harvested, could be used to increase lumber yield from each log, and therefore profitability and sustainability of lumber. Figure 1.2 shows an image of Libor Cech with a log ready to be analyzed.

Knowing that lumber could never be uncut, it was important to maximize the value of that first cut. Also, a very high percentage of lumber was wasted because each log was unique in shape, and premium properties in different spots could be cut with different value propositions. Cech was able to analyze the shape of log from the images and data generated by the scan to increase the yield by an average of 16% to 26%, reducing waste while simultaneously increasing profit with more volume to sell. Moreover, by seeing the data from the scan, and using automated saws and algorithms linked to the spot market, Cech was able to evaluate every possible cut of each unique log and simultaneously maximize the value by ensuring higher value premium cuts. This consideration led to much higher prices for each cut, that when coupled with machine learning algorithms and automation to execute, Libor's company was able to increase the total market value realized per log by an average of 27%.



Figure 1.2 Libor Cech Explaining Lumber Analytics

Source: Image Courtesy of Libor Cech.

This data-centric approach has the advantage of being able to use moonshot out-of-the-box approaches that might become an innovative step forward and lead to a sustainable, competitive advantage. However, the downside is that this approach is also quite risky, because it is focused on discovery, which is trying to find new and interesting uses for your data to add value and solving problems you may not know you have. When you find something, it might be incredibly valuable or only nominally so. Consequently, the results are harder to predict and more challenging to justify investment from a short-term ROI focus.

Executives should encourage their data scientists to develop broad business knowledge, in their industry and also in other related and some non-related ones. Many of the best ideas come from seeing how others are achieving success and getting an inspiring idea or test that might work out. Going to conferences, trade shows, and other venues can offer good ideas to explore. The goal is much more about the right mix of breadth for ideas and depth for execution and evaluation. Another best practice is making sure the analysts who are working for you share ideas and successes, noting and sharing important variables and concepts that worked or did not work in the past.

It should be recognized that this approach to analytics has a higher failure rate than decision-centric analytics. However, many would argue if you have no failures, you are not taking enough chances. For all analytics approaches, especially this one, there needs to be room to explore and try new ideas. By allowing analysts room to explore, and setting things up so that if they fail they fail fast, they capture what they learn and move on. This rapid cycling is essential for innovation and long-term success. It is often true that failed ideas lead to other ideas that might work.

However, there is some risk that goes with the prospect of a high reward from data-centric analytics. Most organizations find it useful to start with a decision-centric approach and gradually expand into a data-centric approach as trust is built in the data and systems. Even if analysts come up with a brilliant idea, the organization is generally less ready to adopt it than they are with decision-centric analytics. Executives less involved in the process are less likely to understand it and therefore less likely to embrace it.

Moreover, to win with data-centric analytics, you must be willing to change at a fundamental level. Few organizations are. With decision-centric analytics, you are doing something you are already doing, just better, making it easier to change. With data-centric analytics, it is likely something you have not done before, and thus it is much more difficult for it to take root in many traditional, non-digital-native organizations.

Analytics professionals with a seeker orientation, discussed in Task 2: The Team, tend to do particularly well with this approach.

Action-Centric Analytics

Both decision-centric and data-centric analytics should be chosen and refined with action in mind, but it is not the same as action-centric analytics. Action-centric analytics assumes that the decision has already been made, through any means, including non-analytical means. The task of action-centric analytics is to help carry out that action and monitor its impact. You might say this is analytics-driven action from a solved problem, an insight, or a desire.

If the action was based on a decision-centric process, the action might be focused on providing guidance with advice and gentle nudging and suggestions. Or, more authoritatively, it may be used for control with rewards and/or consequences for compliance/noncompliance. This approach is more commonly used for employees or gig workers, or sometimes for policing citizens of an authoritarian state. Those with low levels of autonomy are common targets for control, those with higher levels of autonomy are more likely to be offered guidance. However, guidance and control do not have to be for a person; they can also be used for a device, robot, or animal.

If the action was inspired by a data-centric approach, you are more likely to focus on persuasion and impact monitoring to encourage action. The goal here is to persuade decision-makers with a very high degree of autonomy that it is the right or best course to take and to provide feedback and rewards through monitoring to verify or adjust as needed. However, although these methods are most commonly associated with the source of the desire to have an action done, the desire can come from anywhere and any of these mechanisms could be used to encourage or enforce those actions.

Real examples clarify how each approach can ensure actions, because ensuring action is needed for value creation, regardless of how that action was decided. This condition makes it important for leaders to consider how action will be communicated

and carried out when identifying and prioritizing potential problems for analytics to address. If there is no real path to action, the value will be limited. The following examples show how actions can be used synergistically to complement and support each other for cascading value creation.

Guidance

Analytics is put in place to guide workers and some decision-makers to the best decisions and actions for the task they are attempting to do, helping them do it better. This action is usually based on results of earlier decision-centric or data-centric approaches, but sometimes from non-analytics-driven decisions. It is not just reporting, as helpful as that is, but guiding, mostly workers, to take given actions based on a set of inputs.

Joshua Cazier, an executive at Qualtrics, shared how his organization worked with clients to guide action in customer interactions by monitoring not only the customers' transactional data but also by having an AI system listen to and analyze the customers' tone of voice, in real time, to help guide how the customer service or sales agent should best react to get the desired outcome with that customer.

Good customer service agents have always done this back-and-forth intuitively, if not consistently. But now emotional intelligence and appropriate response can be scaled and implemented consistently to get the desired interaction once the best approach has been modeled with a mix of historical and real-time data. It is not about controlling their actions, which is the focus of the next section, but about helping customer service agents do better at what they already want to do.

Control

Whereas guidance is about helping customers or workers do their jobs or tasks better, control is about controlling their behaviors and enforcing rules or policies. Put another way, guidance makes your customers or employees smarter or better at a task that they are already doing, or want to do, whereas control is about making sure they do the tasks that you want them to do when and how you want that task to be done.

It is more common for guidance to be used for those with more education, expertise, and autonomy, historically white-collar workers, and for controls to be used for those with less education and autonomy, such as those focused more on efficiency than creative problem-solving. The blue-collar worker is often in this group as well as others in the gig economy, such as Uber or Lyft drivers and other low-skill workers.

Rather than guide these workers to do what they already want to do better, these analytics are used to control their behavior to meet the organization's goals, usually for efficiency, rather than growth and creativity, as is the goal for guidance. It has its roots in various systems and controls that have been around since the industrial age, but is more automated and intelligent than before, allowing for more adaptability by the firm to adjust in real time, based on feedback and situational awareness of the outside environment. Managers have been using these types of control mechanisms, with less data, automation, and intelligence, for as long as there have been large organizations.

The difference is in scale, enforcement, and optimized guidance, allowing managers much more effective control than in the past.

Michael Wooldridge argues in his book, *A Brief History of Artificial Intelligence*,⁶ that it is exactly this type of action analytics and these control systems that have enabled the rise of the gig economy. It also allows for other large organizations that have instant micro-level control of their workers. Never before have organizations had quite the ability to control such a distributed flock of workers, serving their goals at such a large scale efficiently and instantly based on near real-time analytical data and analysis made possible by action-centric analytics.

A beneficial use might be a shipping or logistics company that uses analytics to monitor the driving habits of its employees. Managers might place various sensors on the vehicles that can tell them how fast the drivers are going, where they are, how hard they are braking, how fast they are accelerating, and how many times they hit a curb or other undesirable activity. It could also monitor whether maintenance is done correctly and any number of other tasks. Managers can then analyze all of the data that comes in, maybe even in near real time, to give a driving safety score and take interventions when needed to meet their compliance goals for the safety of all involved.

Analytics professionals with a native orientation, discussed in Task 2: The Team, tend to do particularly well with this approach, once the actions and enforcement mechanisms have been well designed. However, there are also many real and potential uses of control analytics that most people would consider unethical and demeaning. These uses are discussed in more detail with Task 7: Responsible Analytics, which focuses on ethical analytics and a few other relevant topics. Executives should carefully weigh the pros, cons, and ethical aspects before using control analytics.

Now we look at the persuade and monitor arrow from data-centric to action-centric analytics.

Persuade

Analytics has an incredible ability to persuade, at least for those focused on improving results. This is true of both decision-centric and data-centric analytics. However, for data-centric analytics, this feature is even more important because you are trying to fundamentally change the organization to do things they have never done before, rather than making incremental improvements to existing processes. Because it is a harder task, effective persuasion is even more important to encourage adoption and use.

Therefore, the analytics must convincingly show not only how they will be used but also how those uses will add value in a clear and sustainable way. This value needs to be presented in a way that matters to the people hearing it and in their language, which often has a monetary or time-saving angle.

Dr. Rudi Pleines, mentioned previously, talked about how the ability to persuade people to action with facts and numbers was one of the most important attributes of analytics, and he has used it effectively in many engagements.

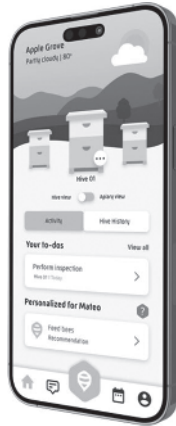


Figure 1.3 HiveTracks Application for Community Intelligence

Source: Image courtesy of HiveTracks CEO Max Rünzel.

Max Rünzel uses analytics to incentivize and empower current and new beekeepers to make better decisions with data-driven advice from their beekeeper platform. HiveTracks communicates through a mix of methods. First, they demonstrate the value to individual beekeepers by showing how many other beekeepers in their region are being supported by the app, for example, “400 beekeepers in your region have performed an inspection” (see Figure 1.3).

Second, the HiveTracks app ensures when beekeepers do in fact enter quality, relevant, and standardizable data into the system that can be analyzed by their software, in real time, and shared with the community as actionable recommendations, beekeepers can use the information to keep their hives alive and healthy. This community intelligence is a vital part of the HiveTracks’ strategy to encourage accurate data collection for hive inspections, flower blooms, and diseases to monitor environmental health and improve biodiversity locally and globally.

It also encourages beekeepers to share their data, because they are empowered by the direct benefit they receive from the community, alerting them to early opportunities to feed or prevent swarming, and helping them monitor and respond to risks, including diseases or weather-related events. The key is the synergistic benefit communicated clearly and acted on wisely. HiveTracks is also working on a gamified incentive mechanism that pays beekeepers for the ecosystem services their bees contribute to for the health of local ecosystems and biodiversity.

Monitor

As you deploy analytics and make decisions based on the data, it is important to monitor the impact and usefulness of your models so you can learn from them, change them when they are wrong or become outdated, and spread the story of your success. All of these components are important to building a culture of analytics, especially when you have many business leaders who may be hesitant to change.

Patrick Getzen, former chief data and analytics officer for Blue Cross Blue Shield of North Carolina, shared that their executives were worried about how the pending

legislation that came to be known as Obamacare might affect their business model. The big unknown was the relative health of the currently uninsured population that was going to be covered as insured. Getzen met with many political leaders at the state and national levels and personally dug deep into the numbers to provide guidance to those leaders, while estimating the impact on quality health care and costs for his organization.

When the law was enacted, Getzen's team put procedures in place to monitor the impact and assess how the models they prepared performed. Getzen soon learned that the team was wrong about the level of health of the uninsured, but less wrong than everyone else who did not use a data-driven approach or one that was less in-depth. Because they had identified the most important variables, and what to look for in their earlier analysis, they knew how to monitor it. Hence, they saw where they were right and wrong very early and had more time than most to adjust and benefit from their analysis. Monitoring their models and the impact this massive change had on their business goals was their key to success in this uncertain environment.

Analytics professionals with a business orientation, discussed in Task 2: The Team, tend to do particularly well with this approach, once the actions and enforcement mechanisms have been well designed.

FINDING VALUABLE PROBLEMS TO SOLVE

This section is centered on finding valuable problems to solve. In the early stages of analytics maturity, it is important to focus on servicing and supporting known business needs with established processes. This focus offers the best potential for a clear ROI and project acceptance and starts to build an analytics culture. It is decision-centric analytics at its best.

Although analytics should continue to address known business needs forever, as the organization matures and accepts analytics into their standard operating process, people within the organization will slowly become more open to using analytics to address other unknown business needs, taking advantage of new and emerging opportunities and becoming more adaptable and analytically driven. This progression makes room for both data-centric and action-centric analytics to take hold and grow in the organization.

There are a few general principles that apply to all three approaches to analytics, but there are additional things to consider for each type. We include these principles in the decision-centric section, then highlight a few differences in the data-centric and action-centric sections that follow.

Decision-Centric Analytics

The following principles can guide you in your search for the best decision-centric analytics projects. They are written primarily for analytics professionals looking for valuable projects, but the principles apply to all leaders guiding analytics in the organization.

Strong Business Impact and Interest

Look for an area with the potential to have a strong business impact and one that is of current interest to the organization. Your early projects should be small enough to be achievable but big enough to be noticed and make a difference. Even at stages of advanced analytics maturity, this principle is still a good one to follow.

Although it is always important to make sure that any potential project has the likelihood of a meaningful business impact, this goal is not enough. It must also be an active area of interest for decision-makers and line up with their short-term and long-term goals, especially the short-term ones receiving a lot of attention, where analytics is likely to help.

At any given moment, a large organization will face many competing pressures and opportunities. There are often a seemingly infinite number of opportunities that could have a business impact. Although a good ROI is important, it is not enough. It has to fit into the current thinking, strategic direction, and, yes, the politics of the organization if it is to succeed.

If you are an analytics professional, do not try to steer the ship in the early phases of analytics. Rather, observe where the ship is going and try to help it sail more smoothly and efficiently on its chosen course. When your analytics is new and unproven, focus on understanding where the organization is going and finding the persistent pain points standing in the way. Listen to what people complain about, where there is a flurry of activity, and where there are opportunities for analytics to help.

Yes, look at established key performance indicators (KPIs) and pay attention to which ones are doing well and which ones are struggling. That said, it is also important to look at durability. Assess if it is a long-term strategic goal of the organization or a fad that may pass. It should be core to the organization for the foreseeable future if you want leadership support to be with you to the end. Otherwise it will be abandoned, even if it has support in the beginning, as the winds change or other core areas emerge and take precedence.

If it is an important enough problem, the executives will be with you to the end, notes Piyanka Jain, CEO of Aryng, as long as you show progress that leads to tangible benefits. Analytics projects that have strong, meaningful alignment with established business goals result in leadership support now and in the future, which is critical to ensuring action is taken from your analytics projects. This is the definition of successful analytics.

By knowing what analytics can do and being aware of what people are trying to do, opportunities will start to present themselves. But it is not enough. These opportunities still need to be achievable, actionable, and have a desired noticeable impact on the speed, efficiency, and direction of the leaders steering the ship. Again, business impact alone is not enough. If it is not helpful in getting the company to where it is interested in going, it is likely to be rejected and fail.

Collaborative Leaders

After you have identified a few areas with strong business impact on the path the organization is interested in going, the next step is finding a collaborative business

leader who can help you get there. Keep in mind, not all business leaders are equally interested in analytics. Some may be unwilling or unable to champion projects for any number of reasons. This may include a distrust of technology, a preoccupation with day-to-day tasks, the high analytics failure rate, fear of disrupting a smooth process, or political considerations.

It is important to factor in someone who has both an eagerness (not just willingness) to work with you on implementing analytics solutions and the ability to champion your project effectively to see it through final implementation and adoption. As you prioritize projects, leadership support is critical to success.

More than title consideration, it will take time, resources, and political skill to persuade, lobby, champion, fund, and support someone for any analytics project. Choosing the right leader for collaboration is almost as important as choosing the right project. Careful thought should be taken in finding the leader and ensuring their commitment and ability to support the project. You want this person to be not only supportive of this project but also able to help build your analytics reputation across the organization to help future projects succeed as well.

In addition to being able to support and champion the project politically, the leader needs to be in a position to either take action based on what you build or discover, or ensure others do. If they cannot ensure action on the analytics, little will be accomplished and the project will be perceived as a failure.

Build on an Existing Decision Process

Every organization follows processes for making decisions. They may or may not be very sophisticated processes, but they work because decisions get made. A great starting place with analytics project selection is understanding the existing processes and then looking for opportunities to improve on them with analytics.

Steve Stone, retired CIO for Lowes, L-Brand, and other companies, talks about finding success by building on where the organization gets its answers now. In discovering where the organization gets its answers now, you learn a great deal about how decisions are made, the extent to which data drives the decision process, and how formalized the process is. All of these considerations can give you valuable clues about what you can do to improve the process.

It is quite difficult to get people to change how they do things. If you come up with a good solution that does not integrate well into employees' existing workflow and their approach to problems, there is a high risk of adoption failure. You need to take steps to mitigate the risk and help them get used to using and benefiting from analytics.

The best approach is to integrate analytics into employees' current workflow and make it easier to use and better in some impactful way. Thirty years of research into technology adoption supports the idea that these are two of the most important factors in adoption (ease of use and usefulness) and a key part of the technology acceptance model.⁷ Building on their current process will make it easier to use and more likely to be perceived as useful because the leader will be familiar with it and understand how

the process works. This is true even when the new solution may, in fact, be more useful, because adoption is driven by perceptions, not necessarily facts.

But note that just one of those factors is not enough. The solution must achieve both to have lasting impact and staying power, which is only possible by understanding and building on the employees' current process. From there you can later add some additional improvements, such as making it faster, prettier, or other new features, but it has to be adopted and accepted first. Take it a step at a time while you are still building your analytics culture.

Focus on Action

Insight is interesting, but action has impact. It is easy and natural to chase insights, to seek to understand, but action is better. To effectively succeed in analytics, you must look at what actions could and would be done differently based on your analytics. If, in the end, nothing changes, you have to ask if it is really a priority or just something interesting to know.

Investigate what actions could potentially be taken and how likely they would be taken if the project bears insight. But do not stop there. It is not just that action would be taken, but that action actually needs to matter. Determine the effect of those actions on the bottom line or other strategic goals of the organization. For example, a small improvement spread over a large number of customers might be more valuable than a very large improvement for a small number of customers. Calculate or estimate the likely impact of those actions, if they were taken, and use this information to guide you to analytics gold.

Develop a Balanced Portfolio

Not all analytics projects will succeed, no matter how hard you try. Even if they do, more of the same is not always the best approach, which may be a sign you are being too timid and not taking the potentially game-changing risks you need to take to stay in the game. Therefore, in addition to the known projects with clear and tangible ROIs, a percentage of your portfolio should be devoted to three additional types of projects: those that grow talent, test game-changing technologies, and enhance your organizational infrastructure to expand its analytics capabilities.

Grow Talent and Reputation

Several years ago, a few friends and I had the privilege of working with a team in an innovative subsidiary of a well-known FANG company (originally named for Facebook, Amazon, Netflix, Google). As mentioned, the goal was to develop and launch a new technology that would help automatically collect data remotely from beehives. Using a radio-based mesh network, it would turn each hive into a transmitter that could relay data in near real time from places without service, exactly the kind of locations where beekeepers like to place their hives.

The project was risky, using a new technology in a yet-to-be-proven way. Even so, there were a number of potential benefits. One of these benefits was the chance to test and develop talent for a new technology that the firm thought could provide many additional benefits. Another benefit was that by focusing their efforts on a societal good (saving the pollinators), the FANG subsidiary saw the potential for a lot of positive PR. The societal good also served another purpose: it would give the team members an added incentive to work hard and learn, even outside their usual roles, given the potential impact.

Finally, if there was a project failure, it was unlikely to have a negative effect on the firm because it was not focused officially on a clear ROI but aimed for a societal good. Thus, it was less likely to tarnish their reputation inside or outside the firm, and quite likely have the opposite effect due to their efforts to do good. This focus greatly reduced their risk, while maximizing their talent development, which could then be used for projects with a clearer ROI after this near risk-free foray into this new space.

The firm benefited from this experiment by building their reputation internally and externally and by growing their talent in a way that enhanced their capabilities. Investing in analytics, even when there is not a clear ROI, may be perceived as a failure but it can also hold the seeds of future success if lessons are learned, skills are enhanced, and foundational technologies are developed that can lead to other projects that succeed enough to make the investment worthwhile in the long run.

My team and I had a similar experience when developing a blockchain traceability system powered by analytics that was designed to help women in rural, impoverished areas of the world climb out of poverty by giving them better access to international honey markets. Part of your analytics portfolio should be set aside, very thoughtfully, for projects that either (1) grow your talent and/or (2) enhance your reputation by giving back and/or by being perceived as an innovative leader in your field.

Test Game-Changing Technology

Once you arrive at a stable level of analytics maturity where there is sufficient support for your efforts to breathe a little, a portion of your analytics portfolio should be devoted to understanding potentially long-term, game-changing technology and understanding how it could affect and possibly improve your industry.

Although this benefit is related to growing talent and reputation, it has a different flavor in that the goal is to not be blindsided by advances in your area, but to actually preserve the possibility you could lead in this area. Patrick Getzen made this objective a priority, helping build and maintain their reputation as a leader and better preparing his teams for structural changes in health care.

Getzen shared an example of seeing a presentation from an AI company that would take all the information and data from a deceased person and attempt to create an electronic personification of that person with their data and fill missing elements in with reasonable extrapolations. This AI avatar could then be asked questions and would give reasonable answers intended to be congruent with what that person might have said or how they likely would have responded.

Getzen saw no immediate implications for health care in this scenario or a few other technologies they tested, but he thought they were interesting and, if a small part of the budget was set aside for these moonshot technologies, they could learn from them and be ready when these or similar technologies became relevant to their industry. Another benefit was improving team engagement: analysts were able to enhance their skills, learn new things, and play with new technologies, which analytics professionals generally crave. Investing at least some portion of the budget in game-changing technology, as part of a wider diversification strategy, made a difference for Getzen and his team by helping them anticipate how changes in technology would affect their business, and it could for you, too.

Expand Analytics Capabilities

Some projects may not have a short-term ROI but can have a long-term impact by enabling other projects. Steve Stone shared how investing in data quality at Lowes enabled them to build many analytics and business successes on top of that platform. It may have been hard to justify the cost on its own, but not doing it would have limited many future projects. Consider important investments in infrastructure, process improvements, and good data governance that can have downstream impacts.

Data-Centric Analytics

All of the decision-centric principles also apply to data-centric analytics, perhaps with the exception of understanding the decision process. Although it can be important to learn and understand the current decision process to see how to change and improve it, keeping your focus on data-centric analytics to find new ways to do things can be difficult if you are too entrenched in the current ways of doing things. This can bias the results toward the status quo.

The approach works best when analysts are given a clear goal and then plenty of flexibility to try new things with lots of resources and freedom to experiment and test new ideas. Along that line, it is often a best practice to insulate and sequester this group away from the traditional business operations to give them freedom to explore.

Capital One used this approach by separating a significant portion of their analysts into one location, encouraging their own culture to build on discovery and experimentation with the focus of better gauging risks in loans. The results were quite remarkable, with upwards of 80,000 experiments a year being done. It also sustained innovation in business processes that were driven by analytics and a culture of change.⁸

Action-Centric Analytics

Action-centric analytics can be very powerful in building an analytics culture. But because it involves changing people's behavior through analytics, it takes very careful management and can easily have unintended consequences, just as any effort to change behaviors can.

For example, Amazon used action-centric analytics to control their warehouse workers, using a metric called *time off task*. They would carefully measure times employees were not doing their primary jobs, such as scanning barcodes. Employees reported feeling dehumanized by being so closely monitored, which drove attrition and created ill will between Amazon and many employees. In fact, it reached the point where New York State⁹ passed a law restricting the use of this flavor of action-centric analytics, what many deemed “dystopian,” which added to the growing negative press about Amazon’s management practices.

Executives should instead start by trying to build on current systems, improving them with analytics, and focusing on practices and expectations that are already well accepted and understood in the organization. As leaders gain more experience with their use and results, it can be easier to expand to newer areas of interest.

Many of the key concerns with action-centric analytics are ethical in nature, as shown in the Amazon warehouse worker example. They are centered on the type of society we want to be and the possible ethical backlash for employees, customers, and the broader society. As mentioned, these issues are discussed at length in Task 7: Responsible Analytics.

Five-Step Process for Finding Decision-Centric Analytics Opportunities

This section can be summarized with this five-step road map to finding the right analytics opportunities for you to consider.

1. **Identify** an area of strong business impact and interest.
2. Find a **collaborative** business leader in that area who is willing and able to help.
3. Take time to analyze and **understand** the business owners’ current decision process.
4. Clearly identify what **outcomes** you and the business leader expect, including what actions can be improved as a result of an analytics project.
5. Create and manage an analytics **portfolio** to support your needs now and in the future.

These five steps can get you heading in the right direction, but there are still a few more things to do before committing to them, as we discuss in the next sections.

THE PROBLEM STATEMENT

By now you have a pretty good understanding of the business problems to address and their likely impact. It is now time to take the business problem and turn it into an analytics problem that you and your team can solve. To be clear, this is *not* just having a “general idea” of a few problem areas and diving into the data to see what fish you can find. At the early stages of analytics maturity, you need to have a crystal-clear problem statement that is achievable with your current resources and has tangible and measurable benefits.

Charles Kettering, former head of GM Research, is famous for saying, “A problem well stated is half solved.”¹⁰ It is worth the time to get this part right. It is not enough to find useful areas for analytics, even with willing partners eager to support you. There must be clear communication and goals, written down, that all parties agree would add value. During the interview for this book, Cecil John, an enterprise architect with 25+ years of experience, said, “if you can’t write the problem down with clear simple goals and objectives, you *don’t understand it well enough to solve it.*”

This idea was confirmed in a recent *MIT Sloan Management Review*¹¹ article and may help explain why a good problem statement is so important. Remember, it is the first of the five manageable tasks. The article emphasizes this critical function with these words: “Too often, teams skip right to analyzing the data before agreeing on the problem to be solved. This lack of initial understanding guarantees that many projects are doomed to fail from the very beginning.”

The problem statement should focus on action. All three types of analytics—decision centric, data centric, and action centric—need clear problem statements that can guide the project, document goals, ensure everyone is on the same page, and illuminate the path to value resulting from some action.

Although each approach needs a clear problem statement, the wording of each is a little different depending on the focus. Each approach should have a fundamental question guiding it for clarity. These questions begin with *why* for decision-centric, *where* for data-centric, and *what* for action-centric analytics.

Focus on Why for Decision-Centric Analytics

Most of the time when a business leader comes to an analytics professional with a problem, what they are really asking for help with is a symptom of a problem, not the real problem. They feel some pain and describe that pain to the analyst and ask them to make it go away. Yet, the pain they describe is seldom the real problem, only one manifestation of it.

Similar to a skilled doctor, the analyst and executive should work together to identify the root cause of the symptoms so they can see clearly to address them. Similar to medicine, one problem can cause many different symptoms, and a symptom can be caused by a wide range of potential problems. Without identifying and diagnosing the real cause for medical and business pain points, the chances of solving them are slim.

My friend, Dr. Beverly Wright, head of data science for Burtch Works, calls this the *why-why*. That is, you have to understand why they are asking you to solve this problem in order to do so effectively. You have to get to the *why* behind the *why* so you can see the root cause you need to address.

One of my personal favorite ways to uncover the root cause of a problem is a concept similar to Wright’s *why-why*. It is a technique championed by INFORMS called the five whys. The idea is to keep asking *why* as you dig into the problem, and seeking

answers at each level, maybe even getting more data and answering the why at each stage. Usually by the time you get to the fifth why you have a good understanding of the real problem and can use that information to craft a better, more-focused problem statement.

Lindsay Marshall, director of data and analytics at Gilbane Building Company, shared how often using this technique can get to the real issue, and how it helps Marshall and the team stay focused on the root of the problem in a way that improves impact. At a previous place of employment, Marshall and the analytics team were struggling with getting the sales team to adopt any analytics model at all. So they took the time to listen, to find out why, with a technique similar to the five whys.

They found that many sales team members, with decades of experience, just trusted their gut and experience more than an analytical model they could not understand. They did not want to risk their jobs and commission on a model that did not make sense to them. Marshall and the analytics team refocused their efforts on a simple and transparent solution that they could explain in a way the sales team would understand. Once the sales team finally understood the model, they adopted it, and this small change increased sales by more than \$1 million in a month. This result was achieved because Marshall's team dug deep enough, with the five whys, to understand the *real* problem so they could address it effectively.

Sam Volstad, the data analytics service manager at GHJ, shared a hypothetical example of how this might work in a case similar to Marshall's:

- "I don't want to adopt the model."
- "Why? What's the hesitancy?"
- "I don't think it's better than my own gut/experience."
- "Why? What is it that makes that difficult for you?"
- "Well, I've been doing alright on my own, and I don't want to risk my commission on this model."
- "Why? I understand your commission depends on your sales ability, but all of the models indicate an *increase* in sales if adopted."
- "Well, I just don't really understand how it will lead to an increase. How am I supposed to risk my income on trusting something that I don't understand?"

Understanding the why behind the pain of the person you are trying to help is critical to finding a solution that works, one where action can be taken. Marshall concluded with the advice that you should never do the first project you are asked to do, or accept the first rejection, but you should always dig deeper to make sure you are addressing the real issue.

Criteria for Good Decision-Centric Problem Statements

One of my favorite analytics books, *Bulletproof Problem Solving*, by Charles Conn and Robert McLean, contends that poor problem statements lead to many project failures.

They elaborate on why this is the case and give useful criteria for good problem statements. Here are a few highlights of their main ideas:

- **Inefficient.** If you use a scattergun approach to data gathering and analysis, it *always* leads to more effort than necessary.
- **Miss the mark.** If you do not take time to understand the decision-maker's values and their boundaries for what is possible, the analyst will miss the mark and the point of their analysis.
- **No action.** If the decision-maker does not feel like their question was answered, even if they may not have asked it well, they will not act.

It should come as no surprise that their criteria are made to address these problems:

- **Outcome-focused.** A clear statement of the problem to be solved is expressed in outcomes, not activities or intermediate outputs.
- **Measurable.** A clear statement of the problem is specific and measurable wherever possible.
- **Decision-maker's values.** A clear statement of the problem is designed to explicitly address the decision-maker's values and boundaries, including the level of accuracy needed, the scale of aspirations, and level of risk they are willing to tolerate.
- **Creative flexibility.** A clear statement of the problem is structured to a sufficient scope for creativity and unexpected results. Problems that are too narrowly scoped can artificially constrain solutions.
- **Organizational level.** A clear statement of the problem needs to be solved at the highest level possible. It needs to be one that works for the organization as a whole, and not just one optimized for a part of the organization at the expense of the whole.

Focus on Where for Data-Centric Analytics

The approach for data-centric problem-solving is quite different. Although domain knowledge helps, there is also a danger in being too rooted in what has been done before and having a bias toward the current process. Here you want to allow for creativity, exploration, and out-of-the-box ideas that might transform your business.

This approach requires less structure on the front end of problem-solving, the opposite of the decision-centric approach, and careful analysis of ideas after some initial exploration. Much like brainstorming, you do not want to dampen the creativity too early. Rather you need to give time to analysts to explore, experiment, validate, and prioritize.

It is helpful to have a clear focus area, like Capital One¹² did on using analytics to price risk appropriately while allowing experimentation on how to achieve it and a rigorous testing process to find out fast if it works. The problem statement should communicate a clear understanding of what needs to be achieved.

Analysts can also benefit by following good scientific principles of experimental design to justify their idea with some reason to believe it will work. Theory, as it functions in science, can help by guiding to more plausible outcomes and weeding out areas unlikely to be productive. This process also helps build confidence in the results and leads to more stable and reliable models.

For example, LeAnne Hill, now an analytics manager at FORVIS LLP, had the clearly defined goal of detecting fraud in financial transactions and preventing it before loan authorization. As the lead analyst on the project, Hill was given freedom and flexibility to try to expand and improve their early detection of fraudulent loan applications.

As Hill explored the data, it became apparent that the majority of fraud that could be detected early was in income and in payroll numbers that had been altered or completely fabricated. Hill realized if these red flags could be identified *before* the loan was authorized, they could reduce fraud. However, Hill also knew that people needed quick answers on loan decisions, or they would go elsewhere, so the process had to be somewhat automated to ensure it could flag potentially fraudulent applications in real time for deeper review.

Being a person dedicated to broad, lifelong learning, Hill came across Benford's law.¹³ This is a law of numbers that predicts the distributions of random numbers, focused on key digits for different types of applications. Hill realized that when people change numbers, they are usually not random, and therefore would not be likely to follow Benford's predicted distributions.

With Benford's law as a guide, Hill began to write code that would test the idea on their historical data, and she was able to see that using this theory could significantly increase their capability to catch and prevent fraud, in near real time. Hill next began writing code to identify these transactions in real time and was able to flag many more potentially fraudulent applications than before, saving the firm from significant losses. Clear objectives, combined with the flexibility to explore and experiment, led to this valuable approach the organization gladly adopted.

In decision-centric analytics, the problem statement is agreed on and set up front, in detail, with criteria for success. With data-centric analytics, the focus is on criteria for success with freedom to explore to achieve those goals and quickly know if the approach is viable.

Focus on What for Action-Centric Analytics

For action-centric analytics, there must be a great deal of clarity for the desired actions and the appropriate agreed-on mechanism for carrying out those actions, using a clear set of rules before application. The problem statements here are more like software development designs with clear, measured steps outlined for when the model detects a behavior of interest.

For the analytics problem statement, clarity is needed on exactly what behavior is being detected or encouraged, in very specific terms that can be modeled and programmed. This specificity needs to be to the level of blueprints for a house that gives

a clear plan for what needs done, rather than general criteria to aim for as with data-centric analytics.

Expanding on an previous example, a few friends and I, including Max Rünzel and Dr. James Wilkes, were asked by some partners affiliated with the UN FAO to analyze our data to test the opinions of experts regarding a few best-practice recommendations for beehive inspection. The thinking of most of these experts was that you should not inspect the beehive during the winter months because the cold air could be disruptive to the hive and lower its chances for survival.

There was some evidence to support this opinion, including from studies of opening hives in freezing temperatures that did hurt the hive. However, these studies were limited in time and geography. We were able to do a five-year historical study across the United States, with matched climate data, focused on this issue. The goal was to determine the action we wanted beekeepers to take: whether they should or should not open their hives in winter. The plan was to then nudge or incentivize beekeepers to follow whichever best practice was proven by the data, instead of opinion and trials limited in time and scope.

Our study showed that hives that were in fact inspected during the winter, contrary to expert opinion, were more likely to survive than those that were not, even when controlled for a variety of other factors. This was true in all climate regions tested, from those with mild winters to those with severe ones and across multiple years.

Using weather and climate data, we saw that, as you might guess, beekeepers who did inspect in the winter did so on comparatively warmer winter days, which was less likely to hurt the hive. We also surmised that by looking at the hives on these days, beekeepers were better able to see and address small problems before they became big ones.

Therefore, we were able to comfortably recommend the action that beekeepers should check on their hives on warm winter days and the software could even send beekeepers push notifications when weather conditions aligned, encouraging them to follow this validated best practice, determining what action should be taken and encouraging beekeepers to actually take that action when the conditions were right. If you are curious, you can read about the study in this peer-reviewed journal article.¹⁴

One important is note that any action, especially those involving people, should also go through an ethical review before implementation.

CHECKING FOR PROJECT VIABILITY

Analytics can be a solution to many problems, but it is not the best answer for every problem. After identifying problem areas of high potential, the next phase of your journey is to assess whether your project idea is amenable to an analytics solution. *Amenable* is a mildly technical term used by analytics professionals to signify that analytics may be a good solution to a given problem, meaning it is likely solvable using analytics.

This book takes a broad view of the term *amenable*, which includes considering the organization's cultural readiness to accept a given analytics solution, because that is the

only way for your organization to receive real value from your analytics. Following are the key variables needed to determine whether a problem is likely amenable to a successful analytics solution:

- **Data availability.** Most analytics efforts require data. If you do not have the required data available, or if the data you have is compromised or otherwise questionable or unavailable, you may need to focus first on setting up processes and procedures to collect and govern data that is most likely to be useful for your business. In some cases, it may be legally or ethically questionable to use certain datasets for a given purpose, necessitating alternatives such as synthetic data, which has similar properties and internal relationships as the real data it is synthesized from, but is anonymous. Or else you might need to consider terminating the project.
- **Data culture.** It is important to assess whether your company is open to data-driven decision-making. Most say they are, but very few actually put it into practice. The clues are in the willingness to trust data and alter decision-making to include data. If this is not the case, your first order of business is to build a culture on data-driven decision-making. This initial step is best done with quick projects that demonstrate meaningful results.
- **Stable environment.** Much of analytics uses data from the past to prepare for and predict the future. This approach works well in relatively stable environments when the future is likely to look a lot like the past. However, in areas of high volatility, low predictability, and a large degree of uncertainty, your future predictions are not likely to be very accurate or useful. They may even lead you astray. Ask yourself how likely the past is to represent the future before you go too deep into the analytics process.
- **Business impact.** Analytics can be very beneficial, but not all analytics affects the business equally. You have to assess the likely impact of using analytics for your project on your business, in business terms, to make sure it is worth the cost and effort. If there is little business impact, it is not likely to be worth the time and effort to do it. For this reason, it is imperative to have both analytics and business leadership on the team from the start.
- **Executive support.** Clear business impact is always required and a good first step, but it is not a guarantee of success. The highest level executives in your organization control the budget and so are in a position to demand that the recommended actions resulting from an analytics project are implemented. That is true success. Getting executives' buy-in during the prioritization process, and then continually updating them on progress and potential benefits of success, is an important job for the analytics and business leaders engaged in a project.

There is a simple tool that can help you discern whether your project is amenable to an analytics solution at the end of this chapter.

PRIORITIZING VIABLE PROJECTS

There will always be more “great analytics projects” in need of attention than there will be time and resources to do them. Now that you have identified promising areas for analytics and screened them for their amenability, it is time to prioritize them.

Here are a few key things to consider as you prioritize:

- **Must-do projects.** There are some projects that simply must be done. They are sometimes contractually driven, and very often they are motivated by legal or regulatory considerations. Occasionally the motivation for a project may be for competitive reasons, when the viability of the business is threatened. Other must-do projects are those that lay a foundation for future projects. Good data governance is an investment that all organizations must make when starting down the data-driven path, allowing for an increase in value down the line. Whatever the reason, start with the must-do projects.
- **Organizational vision.** As discussed previously, it is quite important to align your project with the core vision of the organization. Piyanka Jain shares that aligning the project with the organizational vision by focusing on impactful KPIs helps ensure executive support now and in the future. A high degree of alignment is a critical factor to consider during project prioritization.
- **Time to value.** Sometimes it takes a few highly visible wins, even if the impact is modest, to build support and trust in analytics. Doing so can help acquire additional support and resources, enabling bigger impacts down the road with an emerging data decision-making culture. Time to value is an important consideration for building an analytics culture and should always be factored into prioritization processes. Additionally, when volatile market conditions and technological uncertainties are present, it may be prudent to focus on a short time-to-value project due to the unknown future impact of non-foundational longer-term projects.
- **Model complexity.** Most business leaders will not adopt a model they do not understand. Complex models are harder to understand, can be more error prone, often take more overhead to run, and are difficult to integrate into existing business processes. A simpler model can increase time to value and the likelihood of adoption and impact.
- **Project complexity.** Complex projects have more risk than simple ones. Sometimes the rewards are worth it, but simple projects should be given a few bonus points for achievability and complex ones penalized for the increased failure rate.
- **Visible impact.** The ability to quantify the business impact in a way that shows the value of a project is an important consideration in prioritizing projects. This is the value side of the time to value variable. Yes, speed matters, but so does the level of impact. Keep in mind that cultural change is most effective when

everyone sees the impact and trusts the results. So use metrics that are commonly accepted, used, and valued in the organization.

- **Synergy.** Dr. Bill Disch, educator at DataRobot and former chief analytics officer at another firm, shared how good prioritization often creates synergy because projects aimed at similar goals can often cluster together and multiply value. Look for possible synergies as you prioritize projects to magnify your impact and opportunity.
- **Foundational.** Consider whether the project provides a firm foundation in skills, technology, data, or other factors that can make future projects more successful or easier to complete.
- **Timing.** Another point made by David Houser and Dr. Rudi Pleines in their interviews is the importance of timing. Most project ideas have a shelf life, and their value changes depending on the internal and external environments. A highly relevant project may gain or lose its urgency based on changing markets. Firms can only effectively focus on so many things at once.

It is important to have a process in place to evaluate these and other potentially relevant variables. The tool provided in Figure 1.4 at the end of the chapter can be a useful guide. It is equally important to make the process fair and transparent so that those who need to adopt the analytics feel like they were meaningfully part of the process to create it. Including key analysts and business stakeholders in the prioritization process is generally a best practice, as long as you can minimize politics and gridlock.

Be sure to also time your projects in the broader context of your organization's bandwidth, making sure there is enough free attention to allow for adoptions and use of findings, or projects will die from neglect when more urgent, or noisy, factors intercede. There are always many initiatives going on in an organization at all times; only a few of them are with analytics.

It is also important to consider politics. Though many analysts consider politics distasteful, they do have an impact. At a recent conference, I heard an analytics executive talk about prioritizing according to business needs and aligning projects to strategy, similar to how prioritization is presented in this chapter. The presenter noted how hard it was to manage stakeholders to keep them focused on executing on the strategy they had developed while minimizing distracting projects.

The analytics executive also confessed that sometimes the executive directly above him comes up with a project he is curious about and wants investigated, even if it is not on their strategic road map. Here the analytics executive stated, "I am not dumb," implying a keen awareness that there was a time to keep the boss happy, even if it meant a detour or two, in order to maintain support for analytics across the firm, and perhaps also enhance job security.

Sometimes those tasks are designed for the analytics professional, especially if they are hired to do something that has already been decided. For example, Albert Owusu,

who specializes in government contracting, talked about how in nearly all cases the government has already defined and prioritized projects through the political process, and there is little flexibility or opportunity to prioritize on your own. Cecil John, of Virtual Developer, shared something similar in building cloud and analytics solutions for clients. In these cases you can sometimes share your thoughts, which the client may listen to, but your focus generally becomes executing well on what was already prioritized by others. Both talked about the importance of seeking clarity in requirements for these types of projects.

According to management legend and guru Peter Drucker, “Efficiency is doing things right; effectiveness is doing the right things.”¹⁵ By taking time to use the DAD framework to find the right approach to actions and synergies and to screen and prioritize problems, your analytics projects will be much more effective. The tools provided at the end of this chapter are designed to help you succeed and be more effective with your analytics.

CHAPTER SUMMARY AND EXERCISES

Task 1: Summary

It is tempting to dive into analysis before taking time to find the right opportunities, screen them for viability, prioritize them, and make sure they are properly defined. But it is an inefficient and ill-advised approach. Even if you come up with something that is eventually useful, it is likely less useful than what you could have done by better exploring, planning, and prioritizing.

The first step is to identify which approach or approaches to use, and how to apply them effectively, preferably in a way that creates synergy. The DAD framework can be used to help guide action, which is the key way value is created. It consists of these analytics approaches:

- **Decision centric.** Approaching analytics with the goal of solving a defined problem and finding a path to do so effectively
- **Data centric.** Starting with exploring data as a resource and assessing its value to help with an undefined problem
- **Action centric.** Starting with a defined action believed to add value and then using analytics to encourage those actions through guidance, control, persuasion, and monitoring

Decision-centric analytics needs clear problem definitions, clear enough that a child can understand, including defined goals and metrics of success. Data-centric analytics requires clearly defined and understood data. Action-centric analytics requires a clear understanding of what actions are to be encouraged, for whom and when.

Leaders should make sure the projects are viable, meaning they have data, supportive team members, strong business impact, and more. The projects also need to be rigorously prioritized to meet business needs.

Task 1: Exercises

1. Consider the DAD framework with its focus on decision-centric, data-centric, and action-centric analytics and their potential synergies.
 - a. Give a one or two-sentence description of each.
 - b. Share a real or hypothetical example of each from a domain area in which you are familiar or have an interest.
 - c. Discuss how each approach could be used synergistically in the domain area of your choice.
2. Because most organizations begin with decision-centric analytics, we will start by going through the five-step process for finding decision-centric analytics opportunities described in this chapter to find a valuable problem to solve with analytics.
 - a. Think through each of these five steps to look for a promising area for pursuing analytics in an organization familiar to you.
 - b. Write down three promising areas you find. Be sure to describe the organization and how analytics can be helpful in these three promising areas. Be prepared to share your ideas and observations.
3. Pick one of your most promising areas and convert it to a crystal-clear analytics problem statement. Make sure you explain how it meets each of the criteria listed in Table 1.1.

Use Table 1.1 to score from 1 (needs improvement) to 5 (excellent) on each dimension. If possible, do this exercise with a classmate or friend and have them review and give feedback on each of the five criteria and how they could be improved while you provide feedback for their problem statement.

4. Check to make sure that your problem is amenable to an analytics solution by going through the Tool 1.1: Screening Projects for Amenability. Be sure to write down your scores for each question, report where it ended up on the scoring rubric, and share your observations from this exercise.

Table 1.1 Scoring the Problem Statement

Attribute	Description	Score (1–5)
Outcome focused	A problem statement that is clearly expressed in outcomes, not activities or intermediate outputs	
Measurable	A problem statement that is specific and measurable wherever possible	
Decision-maker values	A problem statement that explicitly addresses the decision-maker's values and boundaries, including the accuracy needed and the scale of aspirations	
Creative flexibility	A problem statement that is structured to all sufficient scope for creativity and unexpected results because too narrowly scoped problems can artificially constrain solutions	
Organizational level	A problem statement that is solved at the highest level possible and works for the organization as a whole, not just a locally optimized one	

5. Use Tool 1.2: Project Prioritization Matrix to assess where your idea fits on the scale. If possible, do this exercise in a team or with a partner to assess and rate all projects against each other, and make a recommendation for which one to move forward when. Write up and share your observations and learning experiences from this exercise.

Tool 1.1: Screening Projects for Amenability

To assess whether your project idea is likely amenable to an analytics solution and can add value to your firm, please follow the steps outlined here.

1. Create a clear picture of your project and make sure you can describe it simply and clearly with a focus on action. Write it in the space here.

2. Rate each of the following questions on a scale of 1 to 5, with 1 being no way and 5 being yes absolutely and 3 being neutral. Circle (or click on) the best answer.

- a. **Business impact.** Is this problem one with the potential for significant business impact if solved?

1	2	3	4	5
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- b. **Data availability.** Do you have easy access to quality data that can help solve this analytics problem with known analytics approaches?

1	2	3	4	5
---	---	---	---	---

- c. **Stable environment.** Is the data you have access to likely to be consistent to similar data you expect in the future?

1	2	3	4	5
---	---	---	---	---

- d. **Data culture.** To what degree does your organization trust data and data-driven solutions?

1	2	3	4	5
---	---	---	---	---

- e. **Executive support.** Are your executives supporters willing to use their leadership position and political capital to lobby for and support this project from start to finish?

1	2	3	4	5
---	---	---	---	---

3. Add up your score for each of these questions. Write it here: _____
4. Review where your score fits on Table 1.2 and determine if the idea is worth taking to the next step to project prioritization.

Table 1.2 Scoring Project Amenability

Score	Rating	Sage Advice
23 to 25	Outstanding!	Run, do not walk, to your colleagues and recommend exploring this idea.
20 to 22	Very Good!	Tread cautiously because you may have a winner. But first check whether there are any fatal flaws, where one of the questions has a score below 3. If so, carefully review if there is a way to improve that score before continuing. Otherwise please discuss the idea with appropriate colleagues because a very low score in even one area can be fatal to your project's success.
17 to 19	Deeper Consideration	Check if you have scores of 4 or 5 for executive support or business impact. If so, dig deeper before walking away to see if there is a way to salvage the project. If those scores are 3 or lower, consider whether it is time to move on.
14 to 16	Lifeline	Notice whether executive support is at 4 or 5 for this project. If so, call in a lifeline from a few friends to see if you missed anything before trying to shelve the project in a politically correct way.
13 or lower	Out of Luck	Note your unlucky number and try to find a more suitable project that can meet similar or better business objectives. Also, seek strong executive support.

Tool 1.2: Project Prioritization Matrix

Here we introduce a tool and framework to help you prioritize among your good potential analytics projects. To use the tool, first go through the following steps:

1. **Identify must-dos.** Determine if this is a must-do project. If so, categorize it as a foundational must-do project and write it in the foundational must-do box.
2. **Estimate likelihood of success.** Assess the likelihood of success for each project under consideration because not all projects will be successful. It does not have to be 100%, because some projects promise enough value to warrant taking a risk. Your task is to balance these factors so you are always bringing value to the organization. A thoughtfully created scale of 1 to 10 can help sort your projects.
3. **Quantify visibility.** Take note that to build a data culture you need quantifiable, visible business impact. Focusing on these properties improves the likelihood of action resulting from a project. Engage your team in quantifying the business impact using established key metrics or KPIs. Doing so will increase visibility and trust. Does a project have these properties? Once you have some numeric estimates, standardize them to a graphable scale, such as the 1–10 scale mentioned previously.
4. **Estimate speed to value.** Determine how long it will take to start seeing value from a project. This estimate can depend on a number of factors. To speed it up, consider including the use of fast iterative development methodologies, such as agile analytics. Whatever the source, do your best estimation. If it is quick it will be more visible, so add a few points to your visibility score. Deduct a few points if there is a longer time to value.
5. **Seek synergy.** Review each potential project to look for synergies. Does doing one project make doing other good projects more feasible? If so, you can estimate the collective time savings (time to impact) on other projects and the increase in visible impact and add it to this project as a synergy bonus, which could lift or slide it to another level.

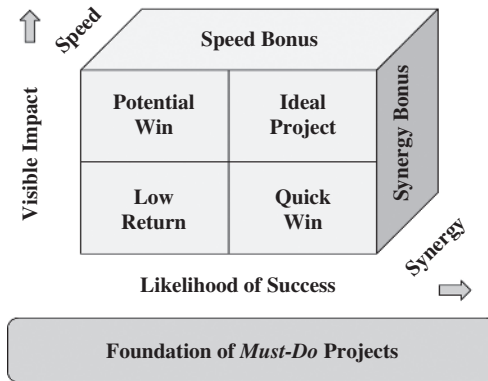


Figure 1.4 Analytics Project Prioritization Matrix

- Graph.** Take the scores on visible impact and likelihood of success and graph them on the core 2×2 matrix as shown here. Next, add a bonus or penalty if appropriate by sliding or lifting a potential project if there is significant synergy or speed.
- Assess project location.** See where each project ranks on your scale in Figure 1.4, which is designed to help prioritize viable analytics projects.

Based on where your projects land on this matrix, you can prioritize them with this list:

- **Must-do.** Start with the must-do projects, but beyond those the following categories can be quite helpful.
- **Ideal project.** Note whether projects deliver high impact in a short time. They should be prioritized very highly.
- **Quick win.** Consider projects that can give some value very quickly. They can be useful to build success stories and make allies by helping solve their annoying problems quickly, even if not as deeply as other projects. They are often worth doing early on to build momentum.
- **Potential wins.** Remember there are often longer-term strategic projects that are quite important for the business, but they take a greater amount of time to demonstrate value. They are important, but consider completing a few projects with faster value to help maintain support for these other types of problems.
- **Low returns.** Consider that these projects are often not worth your doing because they provide low value for your time, so they are best discarded.

NOTES

- <https://www.statistics.com/type-iii-err/>
- <https://www.hivetracks.com/post/2022-hivetracks-outlook>
- F. Davis, *Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology* (Minnesota: Management Information Systems Research Center, 1989), pp. 319–340.
- E. Hassler, P. MacDonald, J. Cazier, and J. Wilkes, “The Sting of Adoption: The Technology Acceptance Model (TAM) with Actual Usage in a Hazardous Environment,” *Journal of Information Systems Applied Research* 14, no. 4 (2021): 13–20. <https://jisar.org/2021-14/n4/JISARv14n4p13.html>.

5. L. Cech, J. A. Cazier, and A. B. Roberts, "Data Analytics in the Hardwood Industry: The Impact of Automation and Optimization on Profits, Quality, and the Environment," *International Journal of Business Analytics* 1, no. 4 (2014): 16–33.
6. M. J. Wooldridge, *A Brief History of Artificial Intelligence: What It Is, Where We Are, and Where We Are Going* (New York: Flatiron Books, 2021).
7. F. Davis, R. Bagozzi, and P. Warshaw, "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models," *Management Sciences* 35, no. 8 (1989): 982–1003.
8. Uday Kulkarni, "Customer Relationship Management at Capital One," Arizona State University MS-ISM Program (2019).
9. <https://gizmodo.com/amazon-amazon-prime-warehouse-workers-1849920947>
10. <https://www.goodreads.com/quotes/449969-a-problem-well-stated-is-a-problem-half-solved>
11. Roger Hoerl, Diego Kuonen, and Thomas C. Redman, "Framing Data Science Problems the Right Way from the Start," *MIT Sloan Management Review* (April 14, 2022).
12. Uday Kulkarni, "Customer Relationship Management at Capital One."
13. F. Benford, "The Law of Anomalous Numbers," *Proceedings of the American Philosophical Society* 78 (1938): 551–572.
14. Andrew Scott, Ed Hassler, Giovanni Formato, Max A. S. Rünzel, James Wilkes, Awad Hassan, and Joseph Cazier, "Data Mining Hive Inspections: More Frequently Inspected Honey Bee Colonies Have Higher Overwinter Survival Rates," *Journal of Apicultural Research* (July 2023): 1–9. <https://doi.org/10.1080/00218839.2023.2232145>
15. <https://www.goodreads.com/quotes/31286-efficiency-is-doing-the-thing-right-effectiveness-is-doing-the>

