# From Guessing to Knowing: How to Become Data Driven

Using data to support consistent improvements in a business is not new. Since a few years back, we have also seen a new wave of Data Driven methodologies evolve where web technologies and mobile communications make it possible for businesses to be directly connected with end consumers. In this environment, being Data Driven is business critical.

However, the adoption of data driven methodologies are often applied with a limited scope in mind and is executed by a restricted community of experts. By broadening the understanding of the principles of being Data Driven to basically everyone in a company, it can become an important factor for all decision making. This, in short, is the Data Driven Culture.

addalot
QUALITY IMPROVEMENT

# Keys for Becoming Data Driven

**Have you ever been told that something has been decided but not why? Have you seen initiatives being launched that later just disappeared without a trace? Or have you maybe experienced taking decisions based on incomplete information yourself, but never knew if they were right or wrong?**

Ideally, as professionals we are well informed and un-biased. Before taking a decision, we make an analysis and look at the data at hand. When there is a lack of knowledge, we learn and adapt continuously based on feedback. We all agree but still it's so difficult to live by. So how can we systematically do it right?

In this white paper we look at some of the common problems with our understanding of the world, learn how to improve by adding data to the process and see how this can eventually transform the way an organization is working through a Data Driven Culture.

In a Data Driven organization, everyone joins the explorative quest to ask questions and gather insights and knowledge to support decision making. In this way, decisions, and the assumptions and data that lie behind them, become open, transparent and help drive the company forward. A Data Driven Culture works very well together with e.g. Agile Methodologies where decisions are decentralized, and development is iterative. It is also laying the foundation for working with advanced data tools like AI.

*A Data Driven Organization can also make bad decisions but will, as part of the process, adapt or even pivot based on the insights it gains. One step back, two steps forward.*

## 1. Acknowledge the Problem

We face many issues when interpreting the world around us. First, we have the cognitive barriers - like different kinds of bias, remembering things that actually didn't happen and overestimating our abilities. Second, there is often a lack of data literacy and a misdirected trust on intuition. Surveys made with senior decision makers around the world reveal that intuition and experience still are the most common base for decisions. In a professional context where consequences of being wrong can be severe, we need to acknowledge these problems and find a better way.

*Study from Accenture on factors used for management decisions*
*1. Intuition*
*2. Personal experience*
*3. More complex data analysis*
*4. Consultation with others*
*5. Simple data and facts*

## 2. Use Data to Gain Knowledge

Rather than intuition and gut feelings, we want the ability to refine data into information and further into knowledge and insights. For example: to say "it is freezing" is a fact, but not very useful in itself. To add that "it is freezing on a November morning in Copenhagen" is data in a context, adding slightly more value. Saying "sub-zero temperatures in November in Copenhagen are unusual" is information that could be useful. When we finally say "you need to drive carefully on this freezing November morning in Copenhagen" we have transformed the data into knowledge.

This data transformation may sound simple, but in general terms it requires steps ranging from data collection, storage and retrieval, securing data quality, enrichment with data from other sources and statistical analysis (or even machine learning). Doing this in a proper and consistent way requires specific skills and is not something that you can just throw as an extra task to the IT or development department.

*Tip*: Aim to "connect the dots" by enriching data with additional sources (e.g. customer order with information from social media, demographic data etc). This makes deeper insights possible.

## 3. The Data Organization

Due to the complexity of data refinement, the data savvy organization is using different competences in collaboration. These include roles like researchers with deep skills in statistics, data scientists or engineers with strong programming skills and knowledge in machine learning and Big Data, business analysts and generalists/creatives that understand how to visualize data.

But how do they fit into the organization? Well, there are two obvious choices: either you create a centralized team, or you decentralize the data experts to the teams where their expertise is needed. A centralized team has the advantage of creating clear career paths, strengthening domain knowledge and getting a standardized way of working. On the other hand, putting the competence in the teams gives immediate access to data knowledge and less administration. Larger organizations, that can afford it, should do both, but also needs to balance the centralized team by securing a cross-functional dialogue to share learnings and best practices (i.e. a federated set-up).



- *Centralized (Blue)*
- *Federated (Green)*
- *Decentralized (Grey)*

*Data Expert Team in the center*
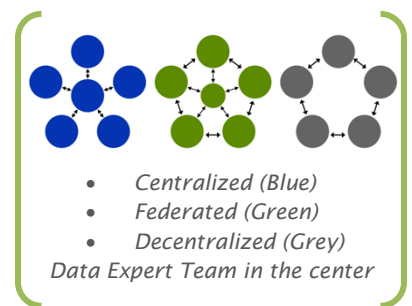
## 4. The Data Culture

As always with transformations, a shift of the organization culture is required. To get things going there needs to be motivation and ability. Making sure that there is accountability for decisions, a mentality of wanting to support opinions with data and having information transparency will help. Providing training, collaborating across teams when learning and being consistent in pursuing the data track also strengthen the data driven direction.

Typical cornerstones of a data driven culture are:

- Openness and trust (resources and information should be available for all – also known as democratization of data)
- Broad data literacy (to participate, everyone needs at least a basic understanding of what it means to work with data)
- Inquisitive questioning culture (it must be Ok to challenge)
- Iterative, learning culture with feedback loops (this fits well with agile methodology)
- Clear goals and a data vision shared and supported by management (to show that it is not an initiative for the few, but company-wide and business critical)

*Common obstacles to introducing Data Driven decision making: lack of trust in data, no understanding of how to work with data, intuition driven decisions are highly valued, no decision accountability, cognitive barriers like biases*

## 5. The Basic Data Driven Method

To be fair, data is not interesting or important in itself, rather it's a means in the approach of (1) moving from an idea or a question through to (2) an experiment with a measurement (collecting or using data), (3) producing a conclusion and (4) improving knowledge that then goes back to the organization in a feedback loop. This is also called the scientific method and is basically what we all learn in school (but somehow manage to forget when we start doing "real" work).

Most of the time it is not known how to move from a question into an experiment, and thus it's worth-while to spend some time to research what is already known in the area and to establish that the question really is the right one. This will be crucial for understanding what and how to measure. Check what has been done before and do this broadly enough so you capture similar situations even though it stems from a completely different line of business or technology than yours. It is way too easy to fall for the misconception that your problem is very special,
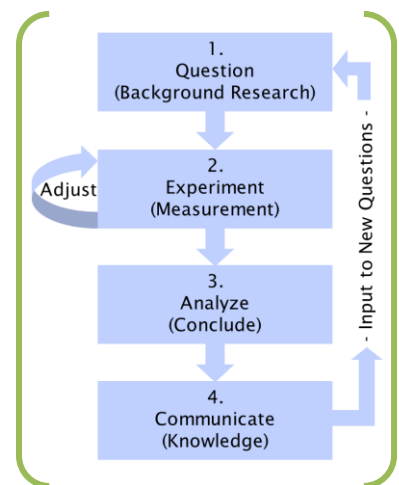
and more constructive to realize that very few things are truly unique. Most likely it's been done before, or you can make a twist of existing methods that will work for you.

# 6. Making Measurements

There are very few things that cannot be measured. Those who state the opposite are probably misled by the idea that relevant measurements must lead to an exact black-or-white answer, like "42". However, if we know nothing about a certain entity – then even a ballpark indication or a range will help us a lot. So, a better view on measurements is to rephrase it as decreasing uncertainty by making estimations. And through the support of statistical methods, we can analyse how (un)certain the answer is. This is good news, since it means that we can ask questions or make assumptions about virtually anything we like, and we are likely to get wiser after doing an experiment or estimating in other ways.

It is not uncommon to hear that measuring things is complicated and will cost more than you gain. But to be frank, it's hard to believe that making decisions in the dark and hope for the best would beat making enlightened ones. Perhaps the issue could be an inclination towards the complex. All the buzz around Big Data and AI can give people the impression that this is what everybody needs but starting simple and learning the tricks of the trade is a much better idea. Most day-to-day problems are perfectly well managed with standard statistical methodology. Simple, in that sense, is often both efficient and effective.

As the organization evolves its capabilities, it will in a natural way start to use more sophisticated tools. Thus, the data driven culture is also an enabler for methodology like machine learning and AI.

*42: The answer to the Ultimate Question of Life, the Universe, and Everything according to "**The Hitchhiker's Guide to the Galaxy**" by Douglas Adams*

***After measuring:** As pointed out previously, it is the analysis or transformation of data, that will lead to insights and knowledge. Approaches that can be used in the analysis of a measurement are e.g.:*
1. *__Descriptive__, a quantitative summary of data.*
2. *__Exploratory__, graphical visualization of data*
3. *__Inferential__, using statistics for hypothesis testing*
4. *__Predictive__, modelling values for new or future data*
5. *__Causal__, establishing causality between variables*

# 7. What to Measure

But where should the data driven methodology then be applied? One area to apply it on could be to improve the **internal** workings of your organization. Relevant internal questions can be things like investigating assumed effects of, say, reorganization, change of process, a new strategy or tools on cost, quality or time used for producing valuable output – on all levels. Another typical area suitable

5

for data driven methods is to do **external** experimentation, like improving the efficiency of the product by interacting with end users. External questions could evolve around things like product design, customer engagement, market growth or sales channels. (Product fit and product evolution by a data driven methodology has been made immensely popular under the name Build-Measure-Learn as introduced in the book "The Lean Startup" by Eric Ries.)

The important thing when going from gut feelings to data is to not limit yourself to only one type of questions – but rather use your capability to work with fact finding in all areas that matter.

## 8. Data Collection

Data can be divided into two main categories: quantitative and qualitative data. Quantitative data consist of data points collected from sources like software instrumentation, diagnostics, sensor information, publicly available data sets or marketing data that are typically available in large numbers and are candidates for high level automation. Qualitative data originate from things like social media, ratings, surveys, interviews or customer service records and will generally need interpretation before conducting further analysis. Regardless of the data type, it needs to be understood that a lot of time and effort will be spent on improving its quality (cleaning it from e.g. duplication, data collection bugs, truncation, bias, manual data entry mistakes etc) – often this effort is larger than the one spent on the actual measurement.

*Typically, 20% of the work with data lies in doing analysis and 80% lies in collecting and cleaning it.*

A comment that is often heard when it comes to data is that it is difficult and expensive to come by. Whereas there may be some rare cases when this is true, it is often just said as an excuse for not doing anything.

*To consider: Data Retention – which refers to the period of time data is stored before it's erased. Deletion is justified e.g. by a fast-moving world that makes old data irrelevant, especially market or customer data, or by cost of storage.*

First, today most companies and organizations already collect a lot of information. A lot. In a Data Driven culture, the democratization of data pushes you to keep a record of what you have and how it is stored. This is also beneficial for regulatory reasons. So, start by checking what data is available within.

Second, to get a relevant estimation for a measurement, you need surprisingly little data. Even small random samples (a few individuals) can give you highly relevant information – especially considering that you may know nothing today. Also, when you have enough data for a relevant estimate, it usually doesn't pay to add more data – or rather, if

*Tip: Keep track of Data Provenance – records that tell where a certain data sample originates from, how it was collected and corrected, for what purpose it was used etc.*

you want a significantly refined estimate you need considerable amounts of additional data. So, don't overdo the data collection part.

Third, new data is not necessarily that difficult to come by. Although the "perfect" experiment could be next to impossible to do, try to re-think it and allow a good-enough measurement to do the trick

## 9. Privacy and Security

When you are collecting and storing data that directly or indirectly relates to personal information, there is always the issue of privacy to mind. It may sound a bit old-fashioned, but apart from laws and regulations that require you to do certain things (a lot more these days), we also have a moral obligation to treat personal information with proper respect. This also links very closely to security aspects, making sure that data is safe within the confines of the organization that is allowed to access it. When use of data grows in a company, there comes a time when proper **governance** should be introduced, not least for these reasons.

*A Data Governance Board joins all parts of the company that are working with data – including Legal. The Board covers topics like regulatory compliance, data inventories, strategy and competence.*

## 10. Measuring Too Much

You sometimes hear of a growing concern that there is excessive data collection and measuring going on, leading to unnecessary administration, pointless number exercises and a feeling of not being trusted. This can certainly be a problem and is probably a sign of an overzealous management working under the assumption that the more measurements, the better. KPIs, Balanced Scorecards and Dashboards are useful tools, but it needs to be assured that all measurements are also used (followed up, actioned), make sense (are based on actual assumptions or questions), produce insights or knowledge and not least that the people that are being measured are part of the process.

*"Not everything that can be counted counts…"*

. . .

## To Sum It Up

So, in summary, what constitutes a Data Driven Culture is essentially quite simple. Ask "why?", ask "how can we measure it?" and make this the standard pattern rather than letting someone's opinion or gut feeling be the basis for decisions. Collect and analyse data, get the right data competence onboard and make sure that learnings you do are fed back and drive the organization forward. Probably, there will be a need for centralized support in larger organizations but strive to make it part of the standard approach for all teams. Measure what is relevant, don't spend time and effort on data you will never need and consider introducing data governance to avoid losing control. And remember that there is a good reason to call it Culture.

## Where to Go from Here

Start by checking where you are today, like: what data can you access, what tools and data skills do you have and how is decision making done (centralized vs autonomous teams). Let this be input to defining a vision and setting goals for the first steps along the path towards a Data Driven Culture. Start small and identify candidate cases for a data driven approach. Celebrate and encourage even the tiny steps on the way.

# About Addalot

## Background

Addalot Consulting has over 25 years' experience of system and software process improvement. The company started in 1989 as Q-Labs, a spin-off from Ericsson, and soon became the leading provider of services related to improvement of software companies in Europe. Q-Labs was bought by DNV in 2006 and in 2011 it was transferred to the newly established company Addalot Consulting. Addalot helps organizations boost results and reduce risks by improving their way to develop and maintain systems and software.

## Philosophy

Our core belief is that the process, i.e. the current way of working, strongly impacts quality and lead time of the products developed. Many companies focus only on results and desire improvements (faster, cheaper, better) without considering what capabilities need to be addressed in order to make it happen.

*Efficient processes give better software*
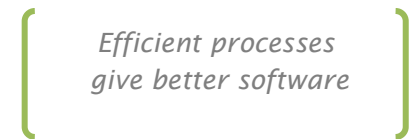
## Addalot's services

**Assessment** – Assessing the capabilities of an organization
**Transformation** – Transforming organizations to reach their targets
**Training** – Training, mentoring and coaching of individuals and groups
**Specialists** – Contributing with expert knowledge
**Management** – Interim management/leader roles
**Innovation** – Assisting organizations in their innovation process

## Customers

Addalot supports both large and small companies in several domains: ABB, Actia, Autoliv, BAE Systems, BMW, BorgWarner, Bosch, Ericsson, GM, FMV, Handelsbanken, Ikea, Ikano, Kockums, Kongsberg, Nokia, Qlik, Palette, Point, Readsoft, SAAB, Sony, SEB, Statoil, Stoneridge, Telia, Telenor, TetraPak, Thales, Veoneer, Visma, Visteon, Volvo.

We are active in Göteborg, Malmö, Stockholm and Copenhagen, based on our main office in Malmö.

*Addalot Consulting AB*
*Gråbrödersgatan 8*
*211 21 Malmö*
*www.addalot.se*
*040-972400*