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DATAPROFIT: A CAPABILITY MAP FOR DATA-DRIVEN GROWTH

JUNE 2017

PRACTITIONER'S GUIDE

INTRODUCTION

Many business leaders have great expectations of the monetization of data. However, reality shows that the path to data-driven profits is neither easy nor straightforward. Therefore, many expectations go unrealized. Over the past two years, we have studied the capabilities that are necessary for realizing data-driven profits. In other words, we have investigated the capabilities firms need in order to transform Big Data into Big Business.

Our work concluded with the development of a capability map – a fairly substantial map detailing nine capabilities that organizations must master in order to release the full potential of data-driven opportunities.

This guide is a practitioner-oriented presentation of the nine capabilities

found in the capability map, which is entitled DataProfit. We describe each capability and invite you to analyze your organization as we go along. On the final pages, we bring the pieces together and create an overview of your organization’s capabilities. Based on that overview, you can develop your own path to data-driven growth. We hope you enjoy working with DataProfit!

PURPOSE

The purpose of this guide is to present the DataProfit tool and describe its application. We hope that it inspires executives on their journey towards data-driven growth. The guide provides an opportunity to evaluate the firm’s competencies. Moreover, it can function as a tool for the development and facilitation of strategy seminars and workshops.

BACKGROUND

This guide and the DataProfit map have been developed as part of the research project “From Big Data to Big Business: Commercializing Big Data by Developing Profitable Business Models,” which is supported by the Danish Industry Foundation.

The research project aims to promote the competitiveness of Danish firms by addressing key obstacles that hinder or limit the realization of data-driven growth opportunities. One of the most significant obstacles is the lack of an overview of relevant and necessary capabilities. To overcome this, we have developed this guide in order to provide an overview of the nine necessary capabilities for data-driven growth – and to assess your organization’s status with regard to them.

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HOW TO USE THIS GUIDE?

Our intention is to offer an easy, hands-on introduction to the DataProfit capability map. This guide gives the reader an opportunity to evaluate her or his own organization's strengths and weaknesses with regard to each capability. We have deliberately refrained from including academic discussions as well as lengthy lists of references, and studies in this guide in order to keep it short and concise.

Readers who are interested in the academic background of our work are advised to look for relevant academic papers at blog.cbs.dk/bigdata.

PowerPoint presentations, worksheets, and posters designed to support in-house discussions and development can also be downloaded from blog.cbs.dk/bigdata. We describe one possible workshop format on page 26.

DATAPROFIT: A BRIEF OVERVIEW

DataProfit is a tool for mapping an organization's capabilities to drive and capitalize on data-driven growth opportunities. Through an analysis of more than 40 firms, we have identified nine capabilities that are necessary to profit from data. These nine capabilities are grouped into three categories (Figure 1), and together they create the DataProfit capability map (Figure 2).

We define capabilities as routines, processes, and workflows that are repeatable and routinized (Winter, 2003). In other words, capabilities are not just a lucky strike that no one can recall how to do again. Moreover, an organization's capability cannot reside in only one person. Instead, it is the organization as a whole that is able to fulfill a certain task through its members.

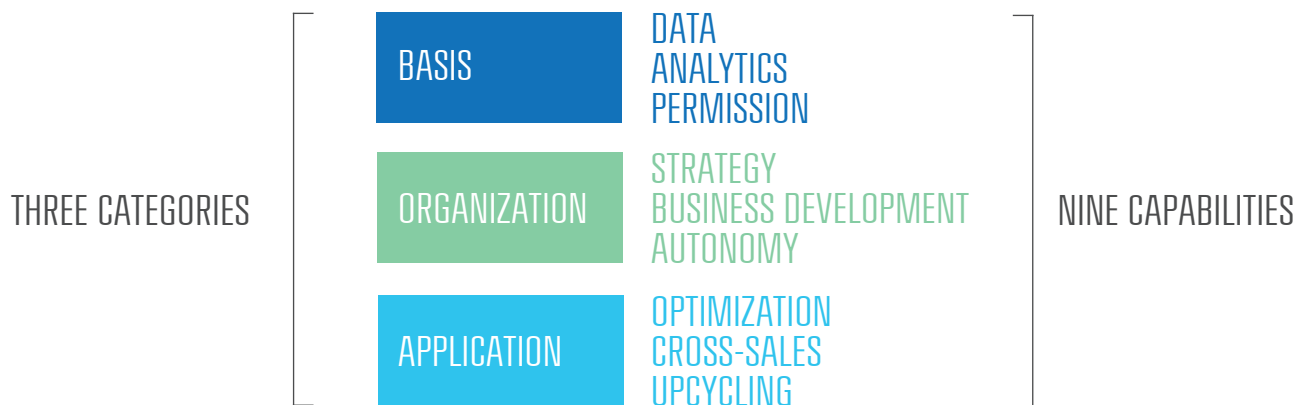


Figure 1: Capabilities for data-driven growth

The nine capabilities are divided into three categories: basis, organization, and application. Each group contains three related capabilities. *Basis* contains those capabilities that are necessary for working with data-driven growth on any level: data, analytics, and permission.

Organization covers those capabilities that build the organizational environment for data-driven initiatives: strategy, business development, and autonomy. *Application* spans the capabilities that are necessary to obtain value from data: optimization, cross-sales and upcycling.

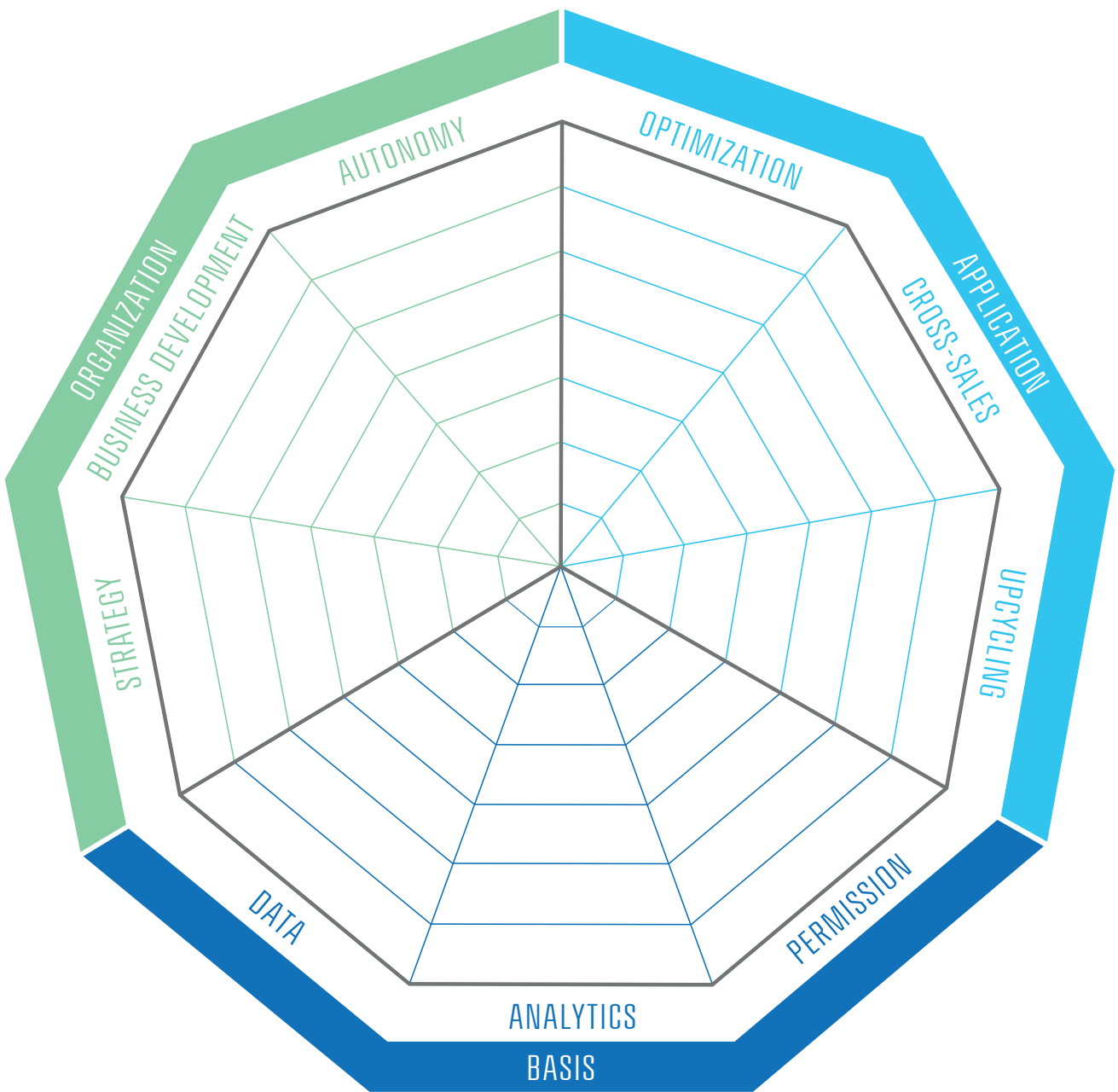


Figure 2: DataProfit capability map

DATAPROFIT

Our 3x3 DataProfit capability map, which features the nine capabilities in three categories, serves as a tool for evaluating an organization’s potential for data-driven growth.

In other words, the DataProfit map can be used to visualize an organization’s capability levels. After an evaluation of the firm’s current situation, strategic decisions and corresponding action plans can be developed.

BASIS:

DATA CAPABILITY

Data-driven growth is not possible without data. Organizations need to collect data (including through purchase) and store it, and the data must be made available for the organization. This capability covers, for example, a firm’s ability to develop sensors, its infrastructure for storing data (e.g. data warehouses), and its ability to safeguard data from hackers.

It is important to make data easily accessible for relevant employees.

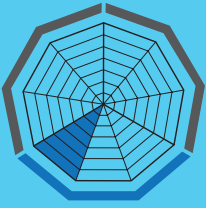
We define the firm’s data capability in terms of the organization’s processes (collecting, storing, and accessing data) and differentiate data in terms of the ownership of it (e.g. own data, others’ data, public data – see Figures 3 and 4).

EVERYONE’S DATA	Data which is freely available on the Internet, for example, public databases, social media websites
OTHERS’ DATA	Data which belongs to others - and to which we need to negotiate access, e.g. customer’s own data
OWN DATA	Data that appears within the company, e. g. production and billing data in ERP systems

Figure 3: Types of data based on ownership (inspired by Cheng, Chiang, & Storey, 2012)

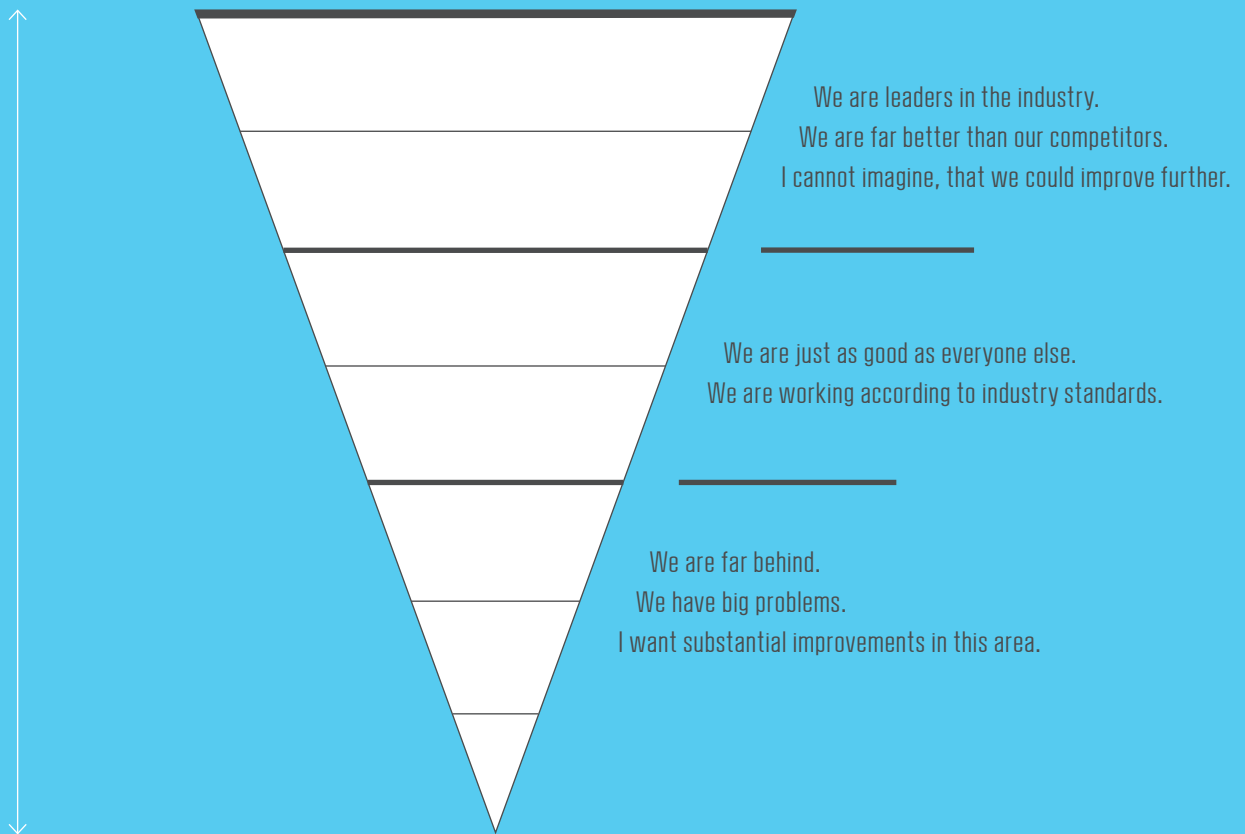
	COLLECTION	STORAGE	AVAILABILITY
EVERYONE’S DATA	① ② ③ ④ ⑤	① ② ③ ④ ⑤	① ② ③ ④ ⑤
OTHERS’ DATA	① ② ③ ④ ⑤	① ② ③ ④ ⑤	① ② ③ ④ ⑤
OWN DATA	① ② ③ ④ ⑤	① ② ③ ④ ⑤	① ② ③ ④ ⑤
			Too poor Just right Really good ① ② ③ ④ ⑤

Figure 4: Data-related processes



HOW GOOD IS YOUR ORGANIZATION'S DATA CAPABILITY?

"We have complete control over all of our data."
"It is easy to find your way around our databases."
"We are probably the organization in this industry that has the most data available."



"We have almost no data."
"Our systems are so old that we cannot do anything."
"We have many different databases that do not even communicate with each other."

Figure 5: Evaluating an organization's data capability

BASIS:

ANALYTICS CAPABILITY

Data can only provide insights when analyzed. The increasingly large amounts of data (“Big Data”) and new data formats (e.g. social media data) require analytical capabilities (Mayer-Schönberger & Cukier, 2014). “Analytics capability” summarizes an organization’s ability to analyze data, and to report and visualize data-driven insights.

Analytics covers everything from classical bar and pie charts to advanced modeling and new methods of predictive analytics. In particular, machine learning and artificial intelligence are expected to change our world in the near future (Siegel, 2016). For example, IBM’s Watson has been shown to be more adept at diagnosing cancer than human doctors (Steadman, 2013).

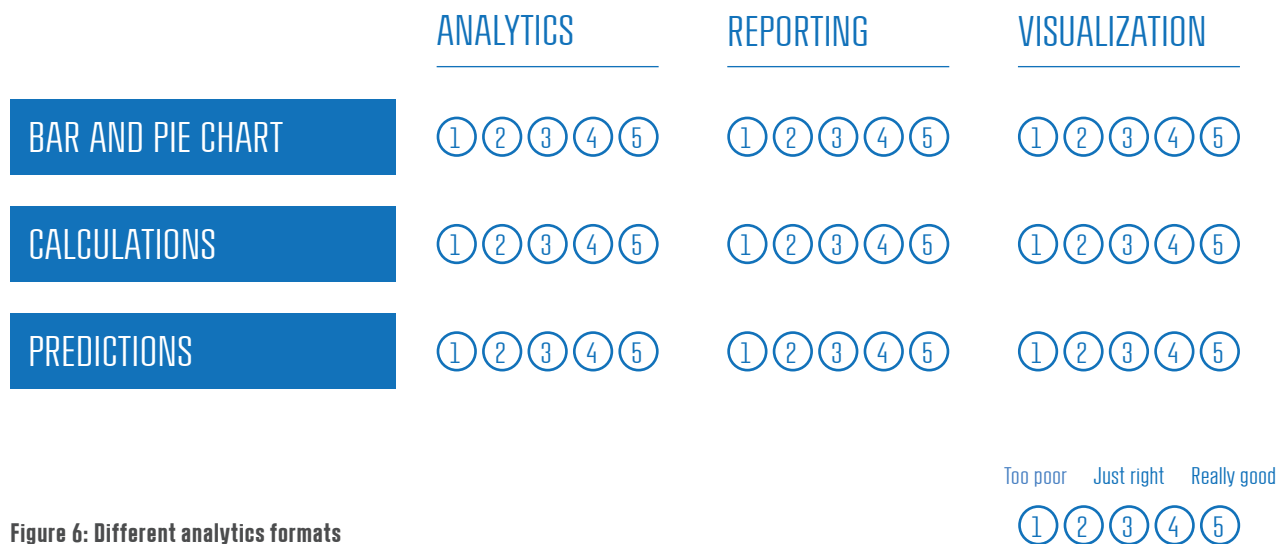
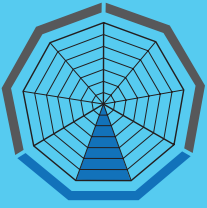


Figure 6: Different analytics formats



HOW GOOD IS YOUR ORGANIZATION'S ANALYTICS CAPABILITY?

"We are competent in all forms of analysis."
"It is easy to produce meaningful reports."
"We are probably the leading organization in this industry in terms of analyses."

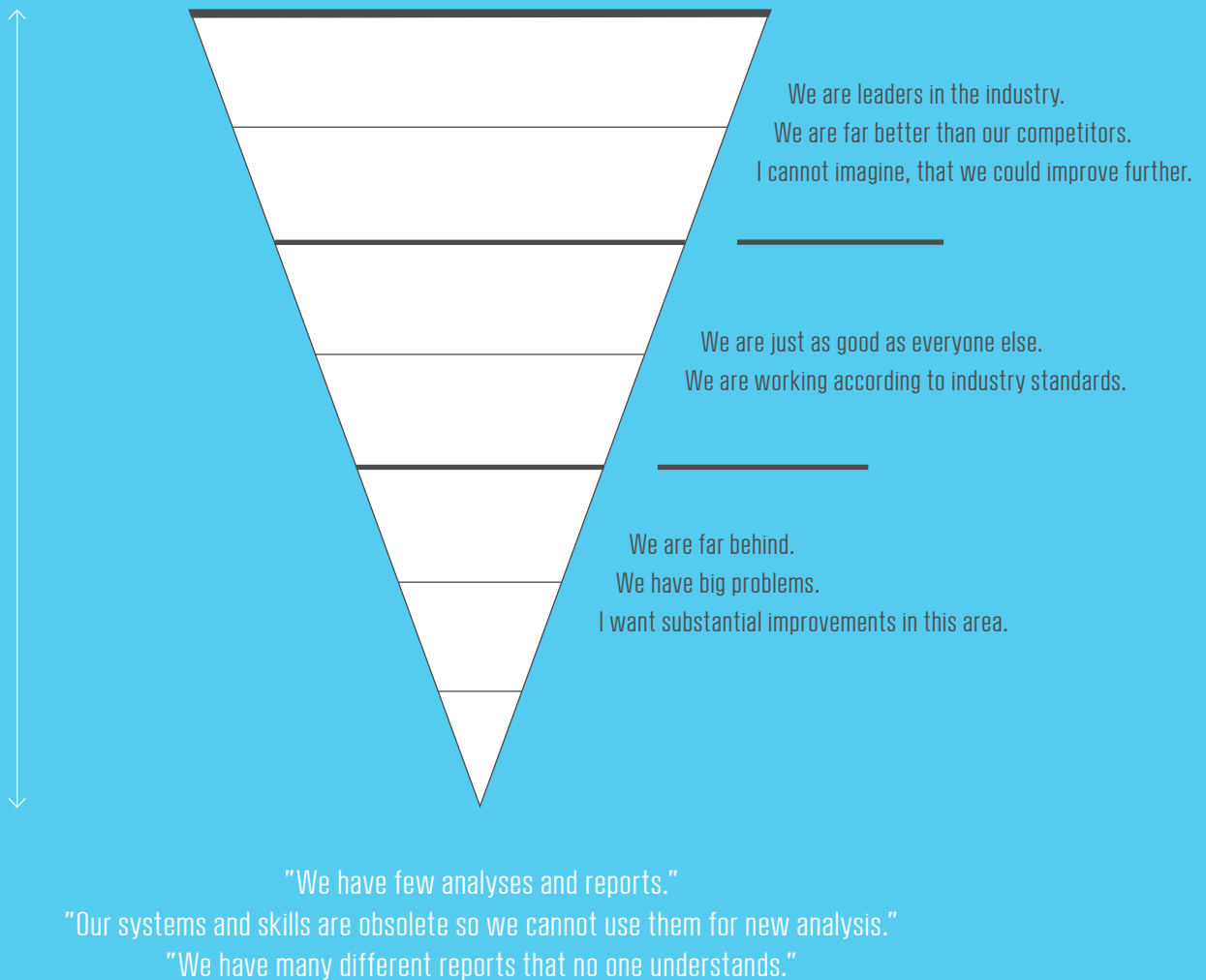


Figure 7: Evaluating an organization's analytics capability

BASIS:

PERMISSION CAPABILITY

In most of our discussions with firms about their data-driven growth ideas, the question of permission arises. In other words, what is allowed and what is forbidden? We have identified three areas that executives need to consider in their search for permission: 1) law, 2) contracts, and 3) societal norms.

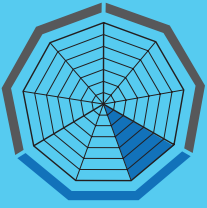
Law is central when working with person-specific data. When data can identify an individual, certain data-security and data-application regulations apply. The legislative framework for such requirements is constantly changing, which imposes significant demands on firms.

The ownership and usage of data is typically specified in contracts between supply-chain partners, but these contracts are often insufficiently specific. Players from different parts of the value chain compete to benefit from the data. A simple example can help illustrate this common situation:

- Does the data belong to the organization that produces the data-generating unit (e.g. an electricity meter, a thermostat, a heat pump)?
- Does the data belong to the organization that uses the unit in a system (e.g. a house, a production facility, an excavator)?
- Does the data belong to the user triggering the data (e.g. a tenant, a manufacturing firm)?

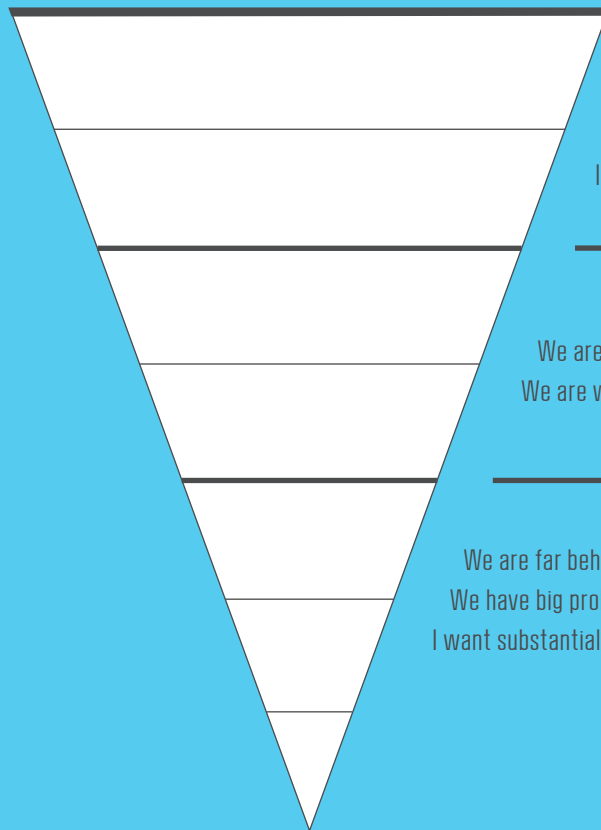
It is important to clarify the parties' expectations and objectives in order to ensure a solid contractual basis for the relationship.

Firms also need to pay attention to societal norms. The use of data may be lawful and other parties in the supply chain may have no objections, but customers or society at large may still find it inappropriate to use data in a particular way. In other words, there may be a conflict between how a company is lawfully entitled to handle data and what society accepts. An organization's permission capability therefore spans law, contract, and societal permissions.



HOW GOOD IS YOUR ORGANIZATION'S PERMISSION CAPABILITY?

"We have full knowledge of all norms, rules, and laws for data usage."
"It is easy to get an answer to our legal questions."
"We have the best legal advisors in the industry."



We are leaders in the industry.
We are far better than our competitors.
I cannot imagine, that we could improve further.

We are just as good as everyone else.
We are working according to industry standards.

We are far behind.
We have big problems.
I want substantial improvements in this area.

"We have no access to legal assistance."
"We are often surprised by our customers' negative reactions when we show them our analyses."
"We lack insight into the legal aspects."

Figure 8: Evaluating an organization's permission capability

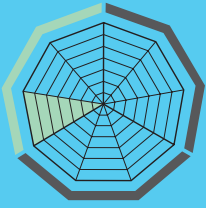
ORGANIZATION:

STRATEGY CAPABILITY

Strategy refers to a pattern in an organization's decision-making (Mintzberg, 1978) that is evidenced in its formal strategy announcements (e.g. a "Digitization Strategy 2020" that specifies concrete investments in digitization) and realized decisions (e.g. through realized digitization projects). DataProfit's focus is on the formulated strategy and we see four related aspects in this capability (inspired by Grant, 2010):

1. Does your organization have a data-driven objective? Is this objective straightforward, easy to understand, consistent, and long-term oriented?
2. Does your organization have a deep understanding of its competitive environment? Is the organization well informed about competitors' data-driven activities?
3. Does your organization have an objective and realistic assessment of its internal resources and capabilities related to data-driven growth?
4. Has your organization consistently and effectively implemented your data plans?

The organization's strategy capability reflects its ability to formulate a data strategy.

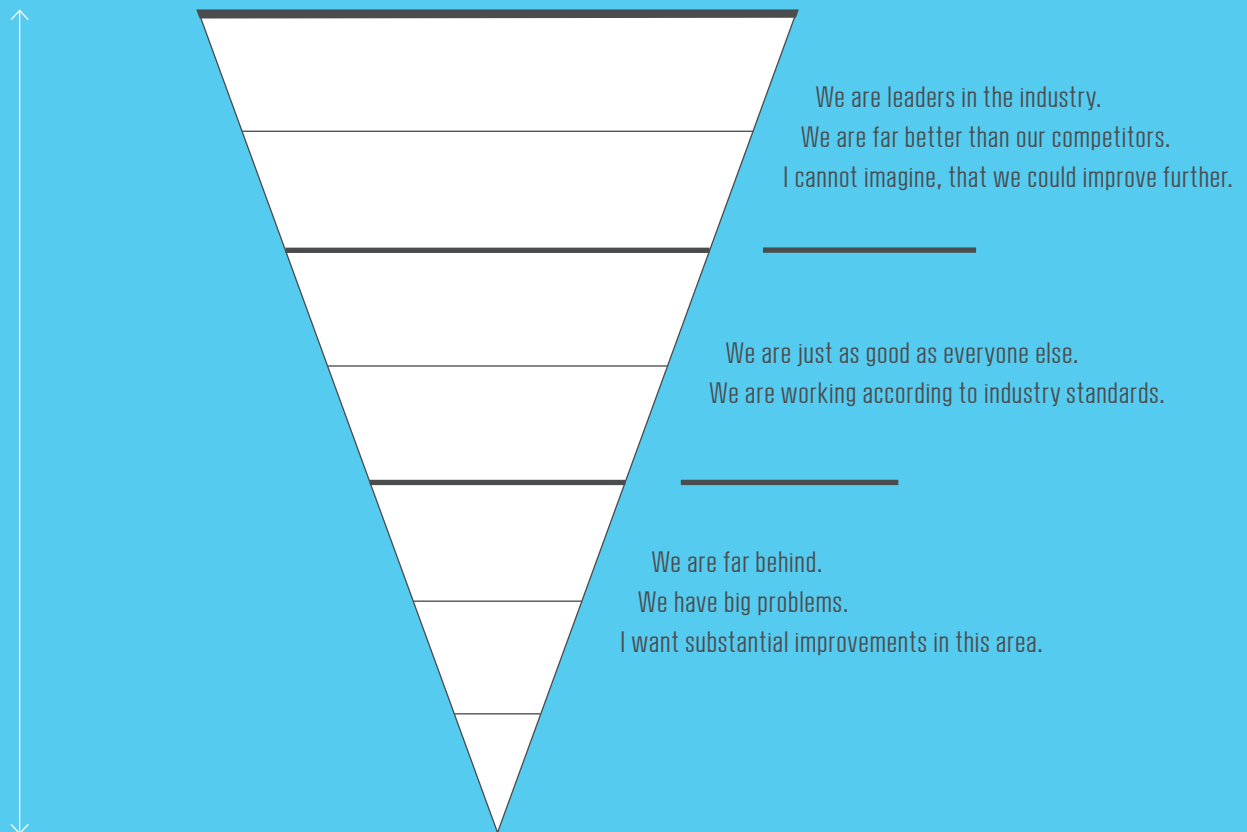


HOW GOOD IS YOUR ORGANIZATION'S STRATEGY CAPABILITY?

"We have a clearly defined digitization strategy."

"For the last few years, many of our decisions have involved data and data-driven growth."

"We are the leading organization in this industry in terms of a digitization agenda."



"We have no strategy – no one knows where we are going."

"We don't know anything about our competitors. As a result, we don't know where we stand in our industry."

"Many projects contradict each other. We do everything 'one step forward, two steps in another direction'."

Figure 9: Evaluating an organization's strategy capability

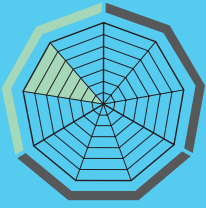
ORGANIZATION:

BUSINESS DEVELOPMENT CAPABILITY

Business-development capability refers to the systematic approach to handling an organization's growth opportunities (Sørensen, 2012). New data-driven growth opportunities must be analyzed and presented to the leadership team in order to get approval for implementation by top management. After a formal decision has been made, the decision needs to be implemented.

Business-development capability captures an organization's ability to

- structure
- analyze, and
- if approved, support the implementation of new data-driven growth opportunities.

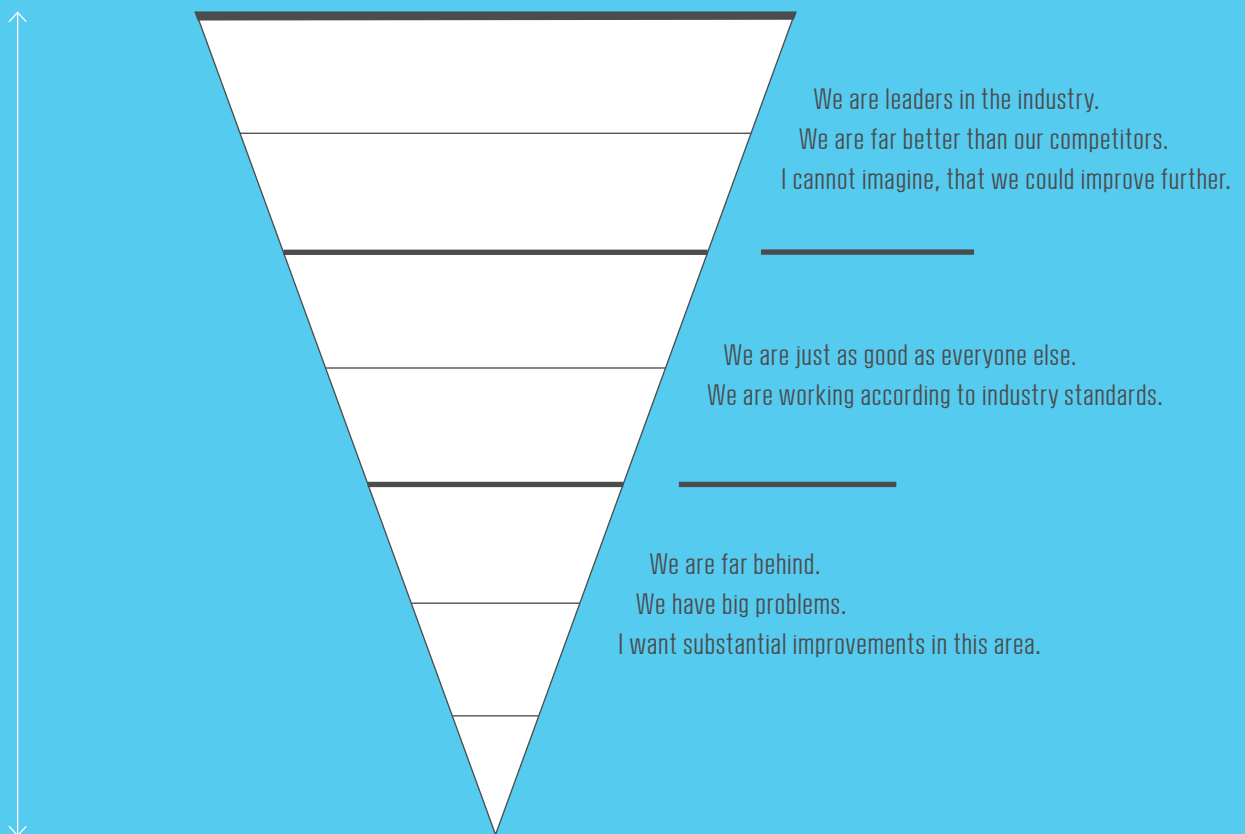


HOW GOOD IS YOUR ORGANIZATION'S BUSINESS DEVELOPMENT CAPABILITY?

"We have a good, systematic process for evaluating new data-driven business ideas."

"We are very good at analyzing and evaluating the business potential of data-driven growth opportunities."

"Focused implementation support facilitates the smooth integration of new data-driven activities into the existing organization."



"There is no systematic process for dealing with new business ideas."

"The development of new ideas is random."

"We do not have employees who systematically work on the preparation, prioritization and support of implementation."

Figure 10: Evaluating an organization's business development capability

ORGANIZATION:

AUTONOMY CAPABILITY

An organization's autonomy capability relates to the opportunities employees have to develop their own ideas and to make their own decisions without the pre-approval of managers. For this reason, managers who desire data-driven growth need to examine their organization's ability to accept autonomous data-driven initiatives – initiatives that originate not in the official strategy, but in employees' own interests and drive. Employee autonomy is important for data-driven growth because organizations need flexibility, innovation, and ongoing adaptation to ensure success in a dynamic data-driven world. Organizations also need experiments, wild ideas, and a culture that welcomes radically new initiatives. This is not the same as saying that all wild ideas should be implemented throughout the organization without further

consideration. However, one needs ideas first in order to develop and assess them later.

Managerial willingness to support employee autonomy opens the way for new ideas and initiatives from all levels of the organization. Your next big jump in growth might come from somewhere unexpected.

We distinguish between two dimensions of autonomy:

1. autonomy that is taken by employees and
2. autonomy that is given to employees.

These two dimensions span a 2x2 matrix illustrating the four types of autonomy that we find in organizations.

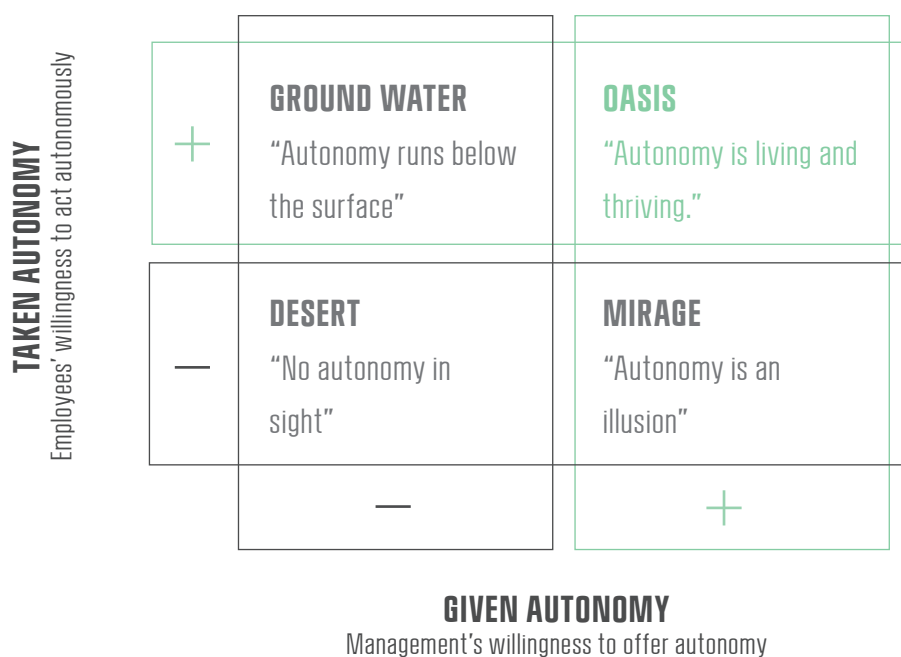
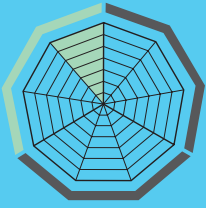


Figure 11: Four types of autonomy in organizations

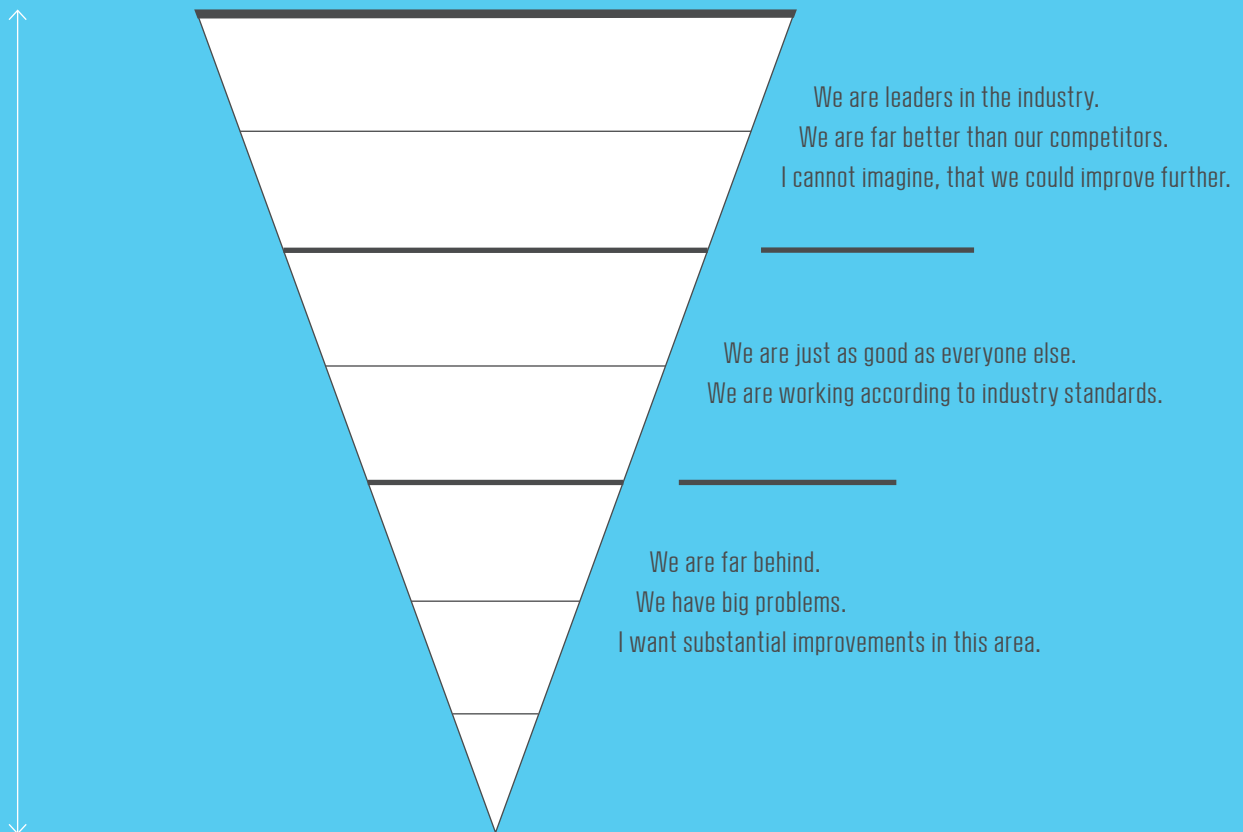


HOW GOOD IS YOUR ORGANIZATION'S AUTONOMY CAPABILITY?

"Our employees regularly have good ideas and management recognizes them."

"A lot of the products, services, and solutions that we sell today started as 'crazy ideas' at the lower levels of our organization."

"Our management is grateful for all the initiatives and contributions made by all parts of the organization."



"Everyone does what they are told to do. No one does anything else."

"People are not interested in trying new things or in experimenting."

"Our managers panic over projects they didn't launch themselves."

Figure 12: Evaluating an organization's autonomy capability

APPLICATION:

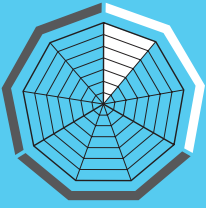
OPTIMIZATION CAPABILITY

Data-driven profits may be realized by using data to improve the organization's operational efficiency (i.e. to optimize existing processes).

For example, data and analytics can enable firms to

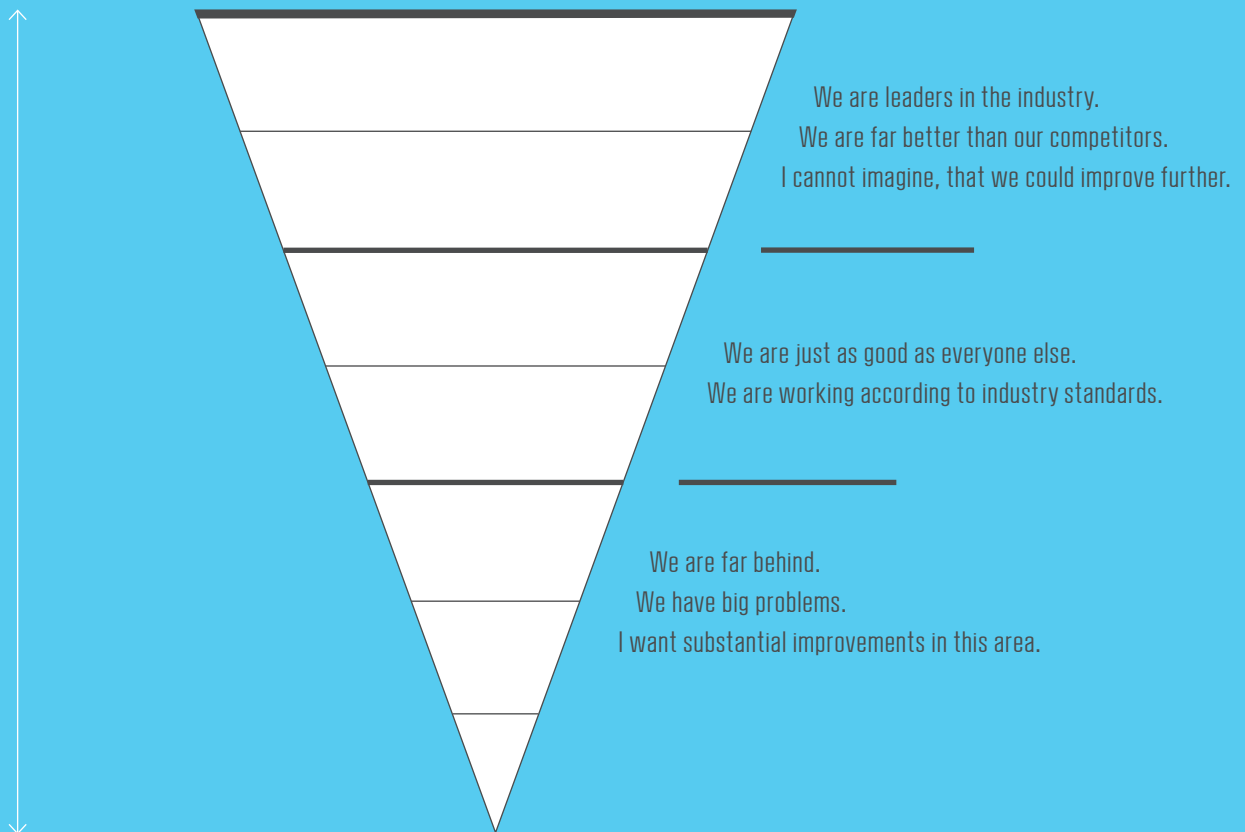
- improve their production planning and scheduling,
- enhance their resource utilization in logistics and services,
- optimize their sales and marketing programs.

The common denominator of optimization is that processes exist, which means that there is a baseline from which the potential improvement can be estimated. Secondly these processes are internal and, as such, not visible to customers, suppliers, or others. These two factors enable the realization of data-driven optimization, as complexity is lower and the success of business cases is less uncertain.



HOW GOOD IS YOUR ORGANIZATION'S OPTIMIZATION CAPABILITY?

"We are constantly optimizing our processes based on data and analysis."
"We have saved a significant amount of resources because we use data."
"Every time we find new data, we immediately apply it for improvements."



"We are very ineffective when it comes to utilizing data."
"We do not know whether our data offers the potential to improve our processes."
"We ignore all of the optimization potential that our data offers."

Figure 13: Evaluating an organization's optimization capability

APPLICATION:

CROSS-SALES CAPABILITY

An interesting yet challenging growth opportunity involves extending interactions with existing customers by adding data-driven offerings to their existing products or services. Such offerings can include reporting of delivery reliability, notification services, and consulting services based on performance data. All such extensions of existing business are related to the organization's ability to sell to the customer.

- convincing existing customers of the advantages of the new value proposition, and
- ensuring profitable contracts with customers (i.e. a positive return on investment).

Cross-sales capability involves:

- understanding existing customers' new data-based expectations,
- designing new value propositions that addresses these new expectations,

SHARE OF MIND



SHARE OF MARKET



"Alright, they have data"

"Yes, please, I would like this service based on data"

Creating customer **AWARENESS** about services based on data

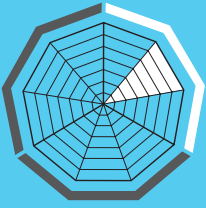
Creating customer **INTEREST** in services based on data

CONVINCING customers to purchase services based on data

Ensuring **EARNINGS** from services based on data

SIGNING CONTRACT

Figure 14: A customer's journey (adapted from Andersen and Ritter, 2008)

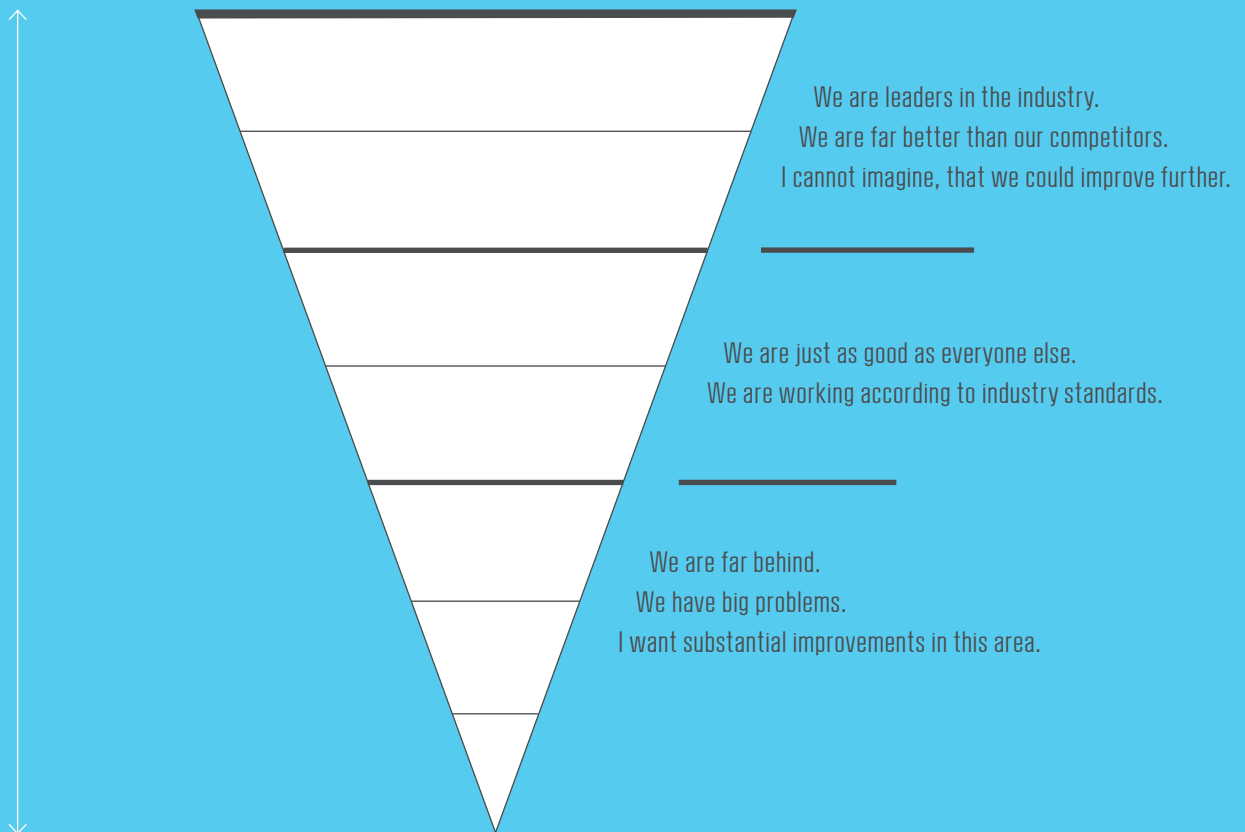


HOW GOOD IS YOUR ORGANIZATION'S CROSS-SALES CAPABILITY?

"We are champions at developing and selling new data-based services to our existing customers."

"We completely understand our customers' expectations regarding data and analytics."

"We are market leaders in data-related services."



"We do not know what our existing customers need."

"Many of our launches are unsuccessful because existing customers don't want our new solutions."

"Our salespeople cannot convince our customers to use our data-related products."

Figure 15: Evaluating an organization's cross-sales capability

APPLICATION:

UPCYCLING CAPABILITY

Many firms realize that their data can have more value in completely new contexts and they re-use their data to enter new markets by servicing a completely new group of customers. An organization's upcycling capability reflects its ability to re-use data to enter new markets.

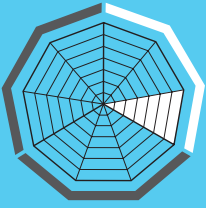
Just as bike tires become fashionable belts or beer barrels become designer shelves, old or dormant resources gain new value in a new cycle of usage. By upcycling data in a new context, new value is created. Once in a while, the data used for such activities is a by-product of or 'waste' from the

organization's original business model— so "one person's waste is another person's treasure".

For example, PostNord consults online stores in its marketing efforts because it knows from its logistics data (i.e. scans of parcels) which parts of the country buy most of various kinds of items on the Internet. Moreover, Google has built an advanced spell-checker based on data about spelling mistakes made in its search engine (Mayer-Schönberger and Cukier, 2014).

“UPCYCLING, ALSO KNOWN AS CREATIVE REUSE, IS THE PROCESS OF TRANSFORMING BY-PRODUCTS, WASTE MATERIALS, USELESS, OR UNWANTED PRODUCTS INTO NEW MATERIALS OR PRODUCTS OF BETTER QUALITY OR FOR BETTER ENVIRONMENTAL VALUE.”

<https://en.m.wikipedia.org/wiki/Upcycling>

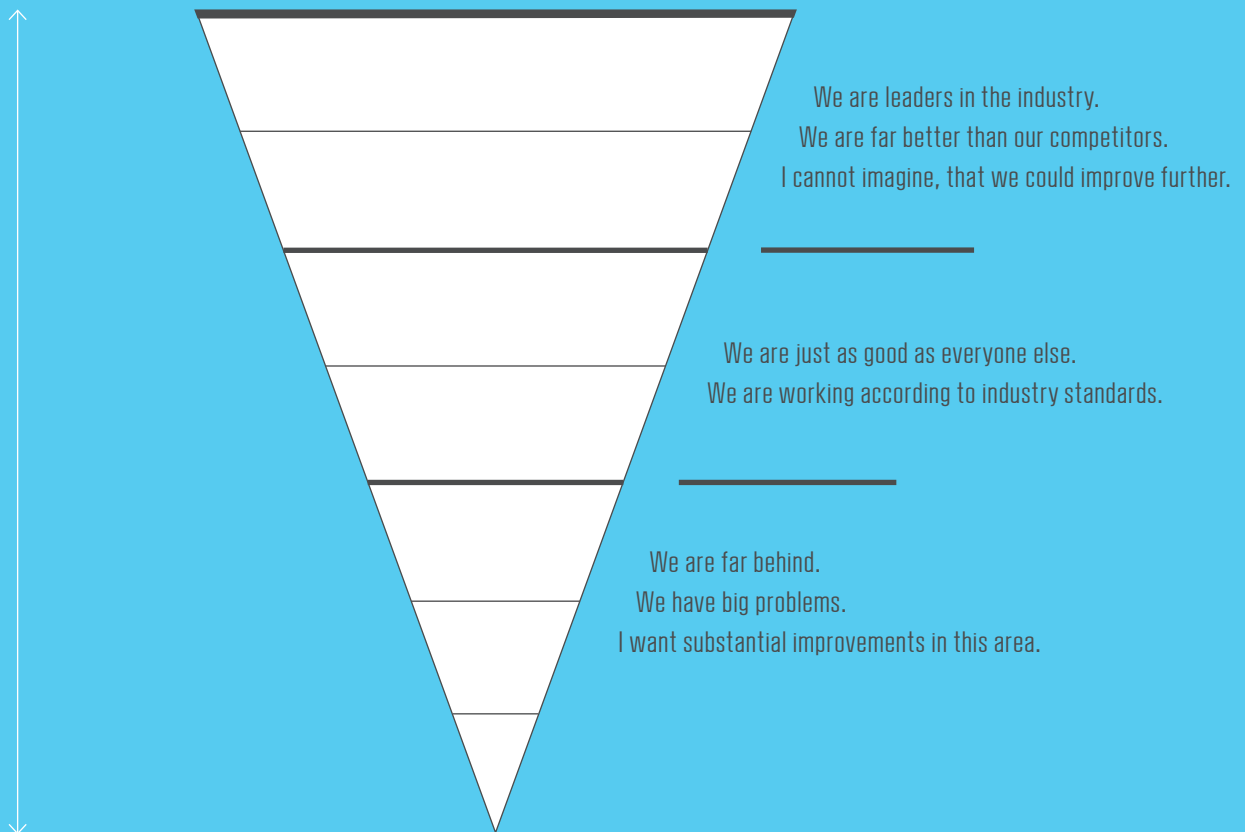


HOW GOOD IS YOUR ORGANIZATION'S UPCYCLING CAPABILITY?

"Because of data, we service customers today that we did not have two years ago."

"We are currently active with upcycled data in a new market that was not one of our original target markets."

"We are constantly developing the understanding of our company, such that we now work with completely different things than we focused on originally."



"Our customers have not changed for the past two years."

"We are focused on our current business. Other opportunities will have to wait."

"We have no desire to enter new markets with upcycled data."

Figure 16: Evaluating an organization's upcycling capability

DATAPROFIT CAPABILITY MAP: THE FULL PICTURE

Based on the individual evaluations of each capability, you can now visualize your organization's DataProfit capability map. Please see the example on the right and use the figure on the next page to draw your organization's map.

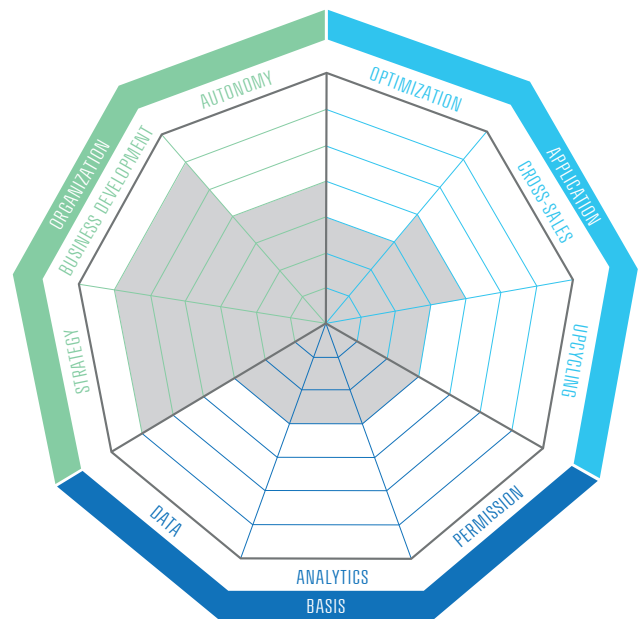


Figure 17: DataProfit Capability Map—an example

Typically, there are employees in an organization with different specialist backgrounds and experiences, each of whom has their own view on the nine DataProfit capabilities. We therefore recommend letting different people provide their views on the capabilities. After those views have been submitted, they can be compared. If anonymity is desired for more honest responses, the moderator can draw three lines instead of a line for each participant: one line for the maximum score given across all participants, one line for the average of all answers, and one line for the minimum. This approach guarantees anonymity. As illustrated in Figure 18, participants may agree on some capabilities and disagree on others. This provides a great basis for a thorough discussion.

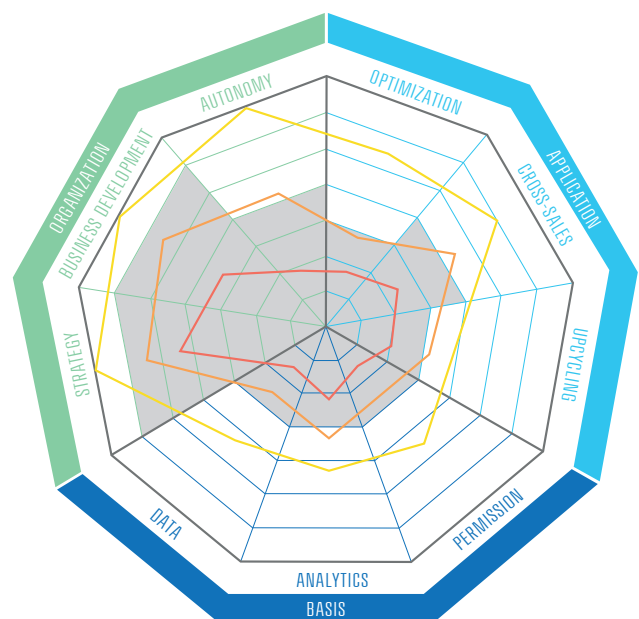
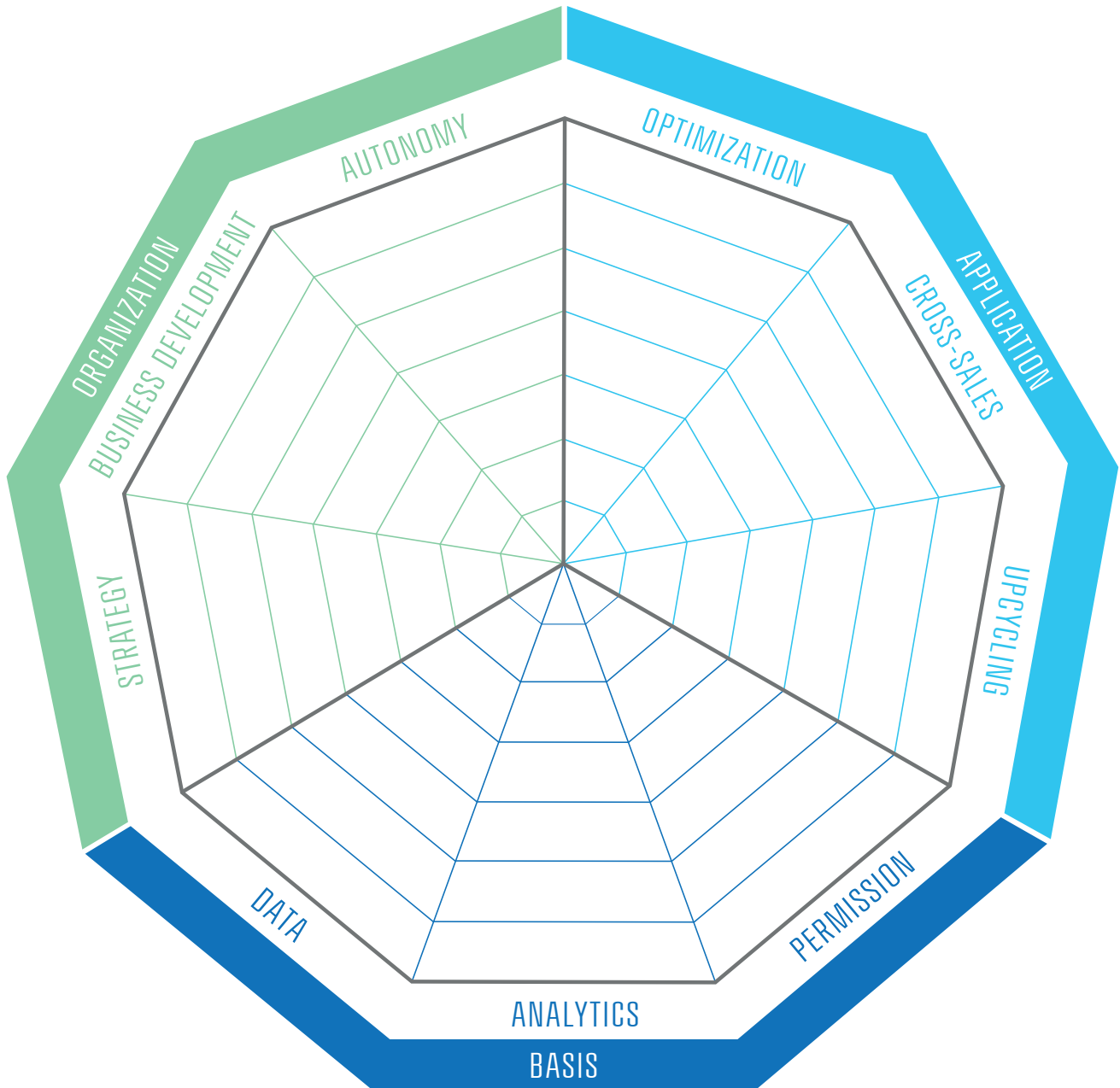


Figure 18: Multiple responses in DataProfit

DATAPROFIT

Draw your organization's evaluations and multiple response lines.



Figur 19: DataProfit capability map

In a workshop, discuss the following questions in relation to all nine capabilities:

- Which kinds of projects have we implemented?
- Which kinds of projects will we implement?
- Which kinds of projects should we implement?

A DATAPROFIT WORKSHOP

– BRINGING THE WHOLE ORGANIZATION TO THE TABLE

We have now visualized the organization’s data-driven capabilities. What’s next? While visualizing your organization’s capabilities on the DataProfit capability map is an achievement, it would be even better to use the map to develop the organization. If the evaluation of the capabilities has in itself triggered initiatives, then the process has already created value. However, we recommend discussing the DataProfit capability map with relevant stakeholders across the entire organization.

As we pointed out earlier, we are interested in organizational capabilities. For each of the capabilities, we highlight the function that typically serves as the anchor for the respective capability. This is not to say where it must be – just where it might be. You can fill in the corresponding department or role for your organization in the empty column on the right. It might well be that one department appears more than once – and that there is a capability for which no one is responsible.

DATA-DRIVEN BASIS	DATA ANALYTICS PERMISSION	CIO Head Analyst Head of Legal			
DATA-DRIVEN ORGANIZATION	STRATEGY BUSINESS DEVELOPMENT AUTONOMY	CEO Commercial Director Employees			
DATA-DRIVEN APPLICATION	OPTIMIZATION CROSS-SALES UPCYCLING	Head of Production Head of Sales Head of Strategy			

Figur 20: Who is responsible?

When all of the boxes have been filled in, the people or departments listed can be invited to a meeting. As all nine capabilities are important, they all need to participate. Moreover, the typical distribution of responsibilities across the organization illustrates one of the challenges in realizing data-driven growth.

At the meeting, the following questions can be considered along with the discussion of DataProfit:

*What are our ambitions for data-driven growth?
Why do we want to embark on data-driven growth?
How can we best organize this transition journey?
Which capabilities should be improved? How?*

*Which concrete projects should we launch?
Which resources do we have or can we use?
Which kinds of activities should we no longer pursue?
Who is responsible for these projects?*



THE DEVELOPMENT OF DATAPROFIT

- First version: We developed the first version of DataProfit, which was known as the “Five-wave model,” based on a review of studies, reports, five telephone interviews, and a workshop with 14 firms.
- Current version: We extended the model to encompass nine capabilities based on ongoing interactions with firms and four workshops with 20 participating companies.
- The next phase will include estimation of the effects of the nine capabilities on performance and mapping of the distribution of responsibilities in organizations.
- The DataProfit team consists of Thomas Ritter (professor, CBS), Carsten Lund Pedersen (post-doc, CBS), Hans Eibe Sørensen (hybrid of business development, CBS and EIBE MGMT), and Christina Merolli Poulsen (project executive, CBS).
- The project is supported by the Danish Industry Foundation.

REFERENCES

- Andersen H, Ritter T. 2008. Inside the customer universe: How to build unique customer insight for profitable growth and market leadership. Chichester, UK: John Wiley and Sons, Ltd.
- Chen H, Chiang RHL, Storey VC. 2012. Business Intelligence and Analytics: From Big Data to Big Impact. *MIS Quarterly* 36(4): 1165-1188.
- Grant RM. 2010. *Contemporary Strategy Analysis* (7th edition). Malden, MA, USA: Blackwell Publishing.
- Mayer-Schönberger V, Cukier K. 2014. *Big Data: A Revolution that will Transform How We Live, Work and Think*. London, UK: John Murray (Publishers).
- Mintzberg H. 1978. Patterns in strategy formation. *Management Science* 24(9): 934-948.
- Siegel E. 2016. *Predictive Analytics: The Power to Predict who will Click, Buy, Lie, or Die*. Hoboken, New Jersey, USA: John Wiley and Sons, Inc.
- Steadman I. 2013. IBM’s Watson is better at diagnosing cancer than human doctors. *Wired*. Read 21 March 2017 on <http://www.wired.co.uk/article/ibm-watson-medical-doctor>
- Sørensen HE. 2012. *Business Development: A Market-oriented perspective*. Chichester, UK: John Wiley and Sons, Ltd.
- Winter SG. 2003. Understanding dynamic capabilities. *Strategic Management Journal* 24(10): 991-995.

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ISBN

Print: 978-87-93226-20-3

Online: 978-87-93226-21-0

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SUPPORTED BY

THE DANISH INDUSTRY FOUNDATION

This practitioner's guide is part of the project "From Big Data to Big Business: Commercializing Big Data through Profitable Business Models". The purpose of the project is to strengthen the competitiveness of Danish companies by addressing key barriers that prevent or limit Big Data business opportunities. The project is supported by the Danish Industry Foundation.