

# Why you should care

What does it mean to be data-driven and how to get there?

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## ABOUT FUTURES BY DESIGN

Futures By Design helps SMEs in rural areas of the North Sea region to use data analyses to innovate, grow and increase productivity.

Futures By Design (FBD) aims to enable small and medium-sized enterprises (SMEs) in regions of lower economic success to innovate, grow and increase productivity. SMEs are critical to regional economies and contribute considerably to regional employment. However, their capacity for success can be limited by insufficient access to data and the inability to analyse data to drive innovation and obtain improved results.

The six project regions are: Cambridgeshire (UK), Antwerp (B), Groningen (NL), Osterholz and North-West Germany (DE), Halland (SE) and Fryslan (NL). Each has a sub-region of lower economic success. Futures By Design will mainly address the industry sectors health technology, light engineering and agri-technology, which are represented in each region and all have a clear SME demand for supporting growth through better data - e.g. data about finance, legal changes, markets and technologies. This will help SMEs to develop strategies how to respond to technology shifts, data analytics and disruptive change.

We will work with 50+ SMEs in each partner region, sharing knowledge, ideas and regional experiences to support SMEs to become more data-driven and better informed about the economic, technological, policy and supply chain changes that will shape their futures.

We will create a virtual transnational horizon-scanning and knowledge transfer (HSKT) hub connecting 6 real hubs (one in each region) to support sustainable SME growth, innovation and productivity. Amongst our target 300+ SMEs we expect to enable 150 to grow, innovate, increase productivity and 150 (many the same SMEs, but not all) to make a major step to being better equipped for the digital age, and for future success.

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## **WHY YOU SHOULD CARE – NOW MORE THAN EVER – TO BECOME A DATA-DRIVEN BUSINESS...AND HOW TO DO SO**

The corona virus has disrupted the economic landscape for SMEs in Europe far bigger than any other event in the 21st century has done hitherto. At time of writing, many of the negative implications for the economy have not even properly revealed themselves. The unemployment rates will rise, the buying power of consumers will decline and the confidence or faith in the economy will reach an historic low. Perhaps even more important, the economy is digitizing at an incredible pace. Whether they like it or not, and whether they are prepared or not, SMEs are forced to ensure their business prevails under the wider policy of “social distancing”. For most, this means joining the digital revolution at a faster pace than the pace which they were acquainted with in their comfort zone pre-corona. For others, this means bankruptcy. In case the message was not clear yet in the past, it ought to be very clear by now for largely all entrepreneurs: adapt to the new digital age, or perish.

The ‘good’ news? Digitization of your business opens up the opportunity to become more Data-driven. Any SME can adapt to the new age and adaptation of data-driven practices comes at a lower cost than ever before!

### **WHAT DOES IT MEAN TO BE DATA-DRIVEN?**

Before we go into the adaptation of a data-driven mindset, it is important to understand what this actually means. A data-driven business is a type of business that gathers and processes data in order to get to actionable insights. In this light, it is important to understand what we mean with terms as ‘data’, ‘information’ and ‘knowledge’<sup>1</sup>. Data is the input that is measurable (i.e. items sold, cost of production, time spend on performing a given task); *Information* is the explanation of what the data has measured (i.e. more items are sold yesterday than the day before; cost of production is increasing; relatively more time is spend on task A than task B); and *Knowledge* concerns the thoughts in the individual’s mind, which is characterized by the individual’s justifiable belief that it is true (i.e. we have sold more items yesterday because we invested more in sales). As such, knowledge can be empirical or non-empirical – and it can be fed by data, but is not necessarily so.

Any business – no matter how digital they are – gathers their own data and is exposed to data generated by their operational processes. This does not mean that all organizations are driven by data in their decision-making and operational activities. Businesses differ in the extent to which they: a) gather their data; b) clean it to get insightful information; c) assess whether this insightful information should impact their individual knowledge base and; d) imply an alteration or an impact on the operational activities.

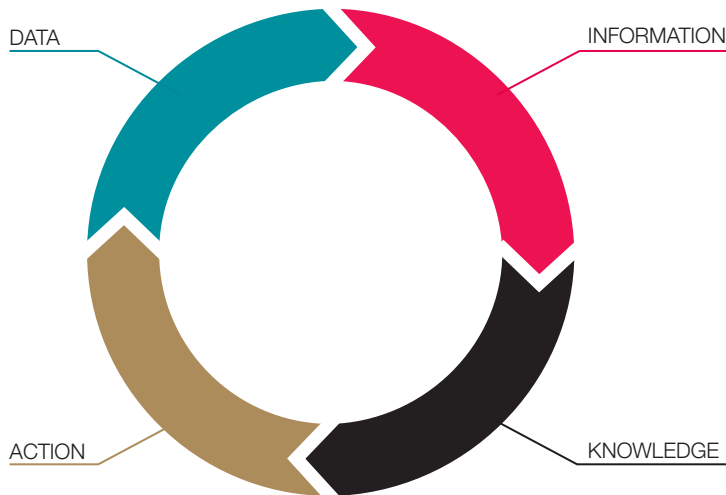


Figure 1. Ideal workflow of a data-driven organization

Figure 1 illustrates the ideal workflow of how data leads to information which feeds into the knowledge base, which leads to particular (operational) action. A simple example that is applicable to all firms regards their financial data: a bakery which sells its bread and pastries stores this data in their cash registry system (or maybe even paper receipts); this data is brought to the accountant who puts the data in an understandable and *informative* format; the accountant shares his insights, feeding the *knowledge* base of the baker; the bakery in turn decides whether or not the *operational activities* should be altered or can continue as it was.

In practice, most SMEs discard the process of data gathering or cleaning and they let both their ‘gut feeling’ plus the way they have been working in the past be the main drivers in their decision-making process. It is very recognizable for an SME to have in light with the above example “a good talk” with the accountant, but once arriving back at the bakery, the operational activities cause the knowledge gained at the accountant to lead to different action “at a later stage” because of “the daily fires”.

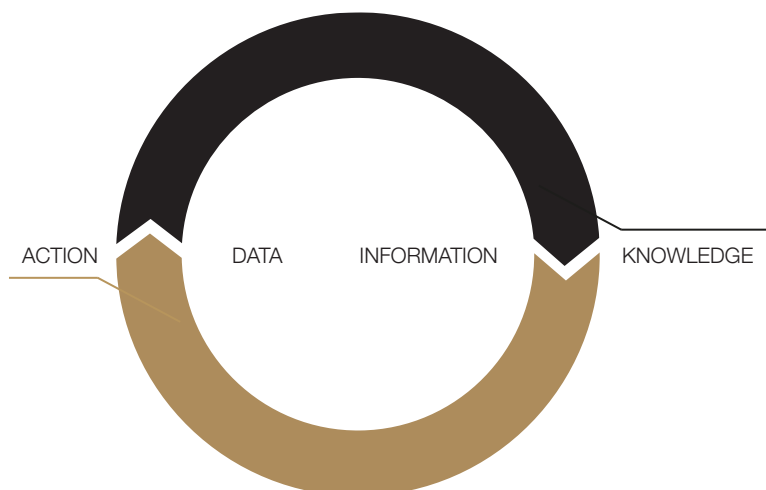


Figure 2. Most common workflow for SMEs

Note that in no way are we claiming the gut feeling of an entrepreneur cannot be a good source for decision-making. In fact, the main takeaway we try to stress here is the following: the contemporary digital era we are in is making it much easier to let data be a source of input *on top of* the gut feeling of the entrepreneur for his/her decisions – yet in a faster, cheaper and more accessible way than it has ever been available.

## WHY NOW?

There are three main reasons why it is now that companies can become more and more data-driven: There is 1) More data; 2) More computational power; 3) More opportunities and software for gathering, processing and analyzing data.

Firstly, already since the 90's more business processes are increasingly digitized, accumulating the amount of digitally stored data. Think of electronic cash registers, websites as a digital sales channel, social media to communicate with customers, business operation systems (CRM, SCM, WMS, ERP, etc.)<sup>ii</sup> Furthermore, an increasing amount of electrical equipment is connected to the internet, a development often referred to as the Internet of Things (IoT): Turning any connected device into a sensor able to collect and send data. The volume of data being collected is increasing exponentially, in 2012 more data crossed the internet every second than the total amount of data saved in the internet 25 years before<sup>iii</sup>. As a consequence of the current corona crisis, forcing all companies over the world to digitize their workflows and meetings as much as possible, this development will only be accelerated at a dazzling pace.

Secondly, our computers have been and are still increasing their computational power and storage capacity, on top of that our network becomes faster<sup>iv</sup>. Due to the rise in cloud computing solutions offered by the big tech companies like Google, Microsoft and Amazon we can use this computational power from any location in an affordable manner. Without owning a super computer ourselves .

Finally, as a result, the increased computational power has allowed for the rapid development of new and more mature data analysis techniques, models and algorithms<sup>vi</sup>. The vast and variate bundle of new data analysis techniques, models and algorithms is encompassed by the field of 'Data Science'<sup>vii</sup>.

The combination of the increased amount of data as a result of digitization, the increased computing power and accessibility thereof, and the development of Data Science as a discipline brings us into a new era in which a substantive amount of digital information about essentially any topic of interest in business exists. Therefore Data Science applications are even claimed to be “the next frontier for innovation, competition, and productivity”<sup>viii</sup>, and as “a major differentiator between high-performing and low-performing organizations”, as it allows companies to conduct business in a more proactive and forward-looking manner<sup>ix</sup>.

If one has not realized during the corona crisis and the rapidly accelerated and forced digitization trend that followed: the fact that so many more aspects of our society have gone digital, means it has become much easier to gather, clean and analyze data. To understand whether your budget can be spend more efficiently, to understand whether your personnel could work more

productively, to understand whether your clients are satisfied with your product or service – never in time has it been easier to measure these inputs, learn from them and act upon these insights. When a company is able to transform this newly created data into information, this company can make better (data-driven) decisions and reorganize, learn and innovate and therefore, strengthen customer relationship management, decrease operational risk, improve operational efficiency and overall firm performance<sup>x</sup>.

## WHAT ARE THE GAINS?

Many SMEs have profited and grown from the integration of data science and have benefited from the transformation in becoming a data-driven business. Companies integrating data science have been found to have higher profitability<sup>xi</sup>, higher productivity<sup>xii</sup> and a more (cost) efficient workflow – and for most companies the benefits have outweighed the accompanying cost of implementation.

Other benefits for SMEs that have been found relate to the value creation the a data driven way of working offers: differentiation from competitors, ability to increase the value of its products, getting a more loyal customer base and making it harder for new market entrants to enter in the SMEs market<sup>xiii</sup>. Specifically investing in data-centric innovation will lead to an increased certainty for business owners. Empirical research has shown that the collection of data in IT systems is a key part for the creation of knowledge<sup>xiv</sup>. As demonstrated in figure 1, when data is collected, the firm has better information, which leads to more knowledge to judge what is happening within the company and can be directly used to make data-driven business decisions. New software has for example allowed SMEs to improve their key customer communication and customer information management capabilities<sup>xv</sup>.

Lastly, when integrating data science in the organization, SMEs gain the – rather intangible – benefit when it comes to the culture and attitude towards innovation and change. Companies have been found to be significantly more agile both in the ability to capitalize on market opportunities and adjusting operations<sup>xvi</sup> when they integrate data science.

## HOW TO START?

Suppose you are an SME and by now you are convinced that becoming data-driven can aid your business. This does not immediately mean that you are able to implement the latest technologies and work in a highly efficient manner in the blink of an eye. In fact, becoming a data-driven business requires time and resources and involves a step by step development process.

Moreover, some businesses understand they can gain from working with data, assuming “data is the new oil”, yet as a result start gathering data for the sake of gathering data. However, as oil needs refinery, data still needs to be processed before it can be used as fuel for value creation in your business. In line with figure 1 above, gathering data will *only* be worth the time and cost if it is done so to provide actionable insights for the organization.



We therefore recommend the following steps to become a data-driven business:

1. Data Maturity: Determine your organizations' data maturity at this moment;
2. Organizational Challenges: Determine your organizational challenges;
3. Check the available data: Reflect with regards to the organizational challenges the extent to which your organization has
  - a. the relevant data gathered in the right way;
  - b. cleaned the relevant data to provide information able insights;
  - c. whether this information reaches key decision makers;
  - d. whether these decision makers use these insights to undertake the corresponding actions.
4. Discuss your insights with a professional data scientist to work towards creating value for your business from data.

### Step 1: Determine Data Maturity

Integrating a data-driven mindset in the organization involves crossing five boundaries – and each of these boundaries relate to a particular data maturity level. The Data Maturity Level can differ between departments of an organization (if the organization is of a decent size), but in general SMEs have a pretty good insight when it comes to their biggest challenge vis-à-vis data at different aspects of the organization. Within the Data Maturity Level of the organization we refer to the following challenges:

1. **Digitizing data:** Data Science starts with ensuring the data is digital. Companies that are working with analogue or paper sheets and receipts not only have a less efficient way of storing and sharing data, in practice they also often lack the infrastructure and culture to integrate the latest technologies in say Machine Learning immediately.
2. **Cleaning data:** After the data is digitized, it is important that the data is put in a format which with it can easily be accessed for later analyses. Moreover, the data ought to be “clean” – with which we mean it is consistent, accurate and up to date.
3. **From data to information – Descriptive Analysis:** After the data is cleaned, organizations can use the data to gather information on their own operations and workflow. How many items have I sold in week 6 of this year? How many clients are from my neighborhood? Descriptive analyses help an organization in getting a grip on the operational activities and enable an organization to more actively take on a direction towards the future.
4. **From information to knowledge – Predictive Analysis:** Whereas descriptive analysis aids an SME in gathering information on the business processes, predictive analysis uses the historic data and insights in aiding the knowledge of an SME beyond the gut feeling. Predictive analysis allows an organization to receive insights on what is expected to happen in the future with a particular probability and thus in turn helps

the decision maker to take a particular course of action, as the uncertainty about future events will be further reduced.

5. **From knowledge to action – Prescriptive Analysis/Algorithms:** Once a company has reached a level of predictive analyses and trusts in the algorithms created, it can turn to an automated decision-making process on the basis of the available data. One can think of an automated algorithm that discovers on the basis of the data that a particular client has a higher probability of cancelling their contract soon – and therefore automatically send this client an offer or particular reminder of why he/she has to keep using the product/service.

The Data Maturity level refers to the readiness of an organization of working with data. As mentioned, any organization has data, but it depends on the data maturity to what extent this data can be put to insightful use. To put it simple: if an organization has most data in an analog format (i.e. paper) it requires a lot more effort to ensure an actionable insight is derived from the data than when the data is put digital, is cleaned and put in an informative and accessible format. To digitizing a business requires some investment, however if done in an adequate manner, this will unlock value in the long run by allowing fast, accurate and valuable insights to guide business decisions.

There are many Data Maturity Scans available for free. [We recommend this scan which considers an organization's culture, infrastructure, skills, processes and resources.](#)

## **Step 2: Determine the organizational challenges**

After the corona crisis, many organizations will face a general challenge of “becoming more efficient” or more specifically their focus is on “how to cut costs”? We recommend to reframe these challenges, focused on a concrete area of business (e.g. marketing or financial administration) and evaluate the status of the data within your organization in light of the above data-driven decision-making model.

The below table 1. provides a framework for prioritizing the organizational challenges and mapping these on the data maturity of the organization for each area of business. It provides an illustration of an organization for which the financial administration and marketing is the main focus of the organization in integrating a data-driven mindset. We can observe that the organization in question is primarily helped by a) gaining insights from the available financial data; b) cleaning the marketing data. Of course, one can also imagine that this organization is helped by organizing resources to ensure a predictive maintenance analysis, yet since there are other elements this organization deems as more important, the general recommendation is to prioritize the data science integration accordingly.

## **Step 3: Check the available data**

Even if the available data is digital or used for descriptive analysis in the organization, it can be the case that the cleaning process of the data could use improvement. Moreover, many organizations are locked in to particular software via which it is difficult to extract the data in a format that it can be used for other analyses that the software is used for.

The data that you want to use to base your decisions on should be digital and ‘clean’, as you need to be able to trust the data if you want to unlock the value that lays in the potential of having the data make predictions and decisions for your business.

#### **Step 4: Discuss the insights with a data science professional**

One of the main issues SMEs have in talking with professional data scientists is that the average hourly rate a data scientist charges is relatively high<sup>xvii</sup>. Having a conversation with a data scientist without completing the above three steps results in an expensive endeavor which you as an organization can save already upon.

Nevertheless, at one point, you will have to discuss how to move forward with a professional. Preferably they can guide you in the direction of how to prioritize the next steps further. One may want to use the canvas here as the foundation for the conversation and ensuring that a) the data scientist has a thorough image of the organization and potential challenges; b) the organization has an image of the areas where the data scientist can help.

#### **IN CONCLUSION**

The corona crisis and the accompanying social distancing measures implemented by national governments leading to a low touch economy, have made a huge impact on the digitization trend. Especially for SMEs, digitization is forced upon them in a more rapid fashion than most of them feel comfortable with. Nevertheless, now is the time – more than ever – to join this trend. In this paper we have provided the benefits and first steps an SME can take in organizing itself towards a data-driven business.

	How important is this area for our business – and sustainability for our business?	Is our data digitized?	Is our data clean and ready for analysis?	Can we derive specific information from our data to help our decision-making process?	Can we use our data to make predictive analyses?	Can we automate our predictive analyses in our decision-making process?
Financial administration	Very important	Yes	Yes	No	No	No
Marketing	Very important	Yes	No	No	No	No
Maintenance	Important	Yes	Yes	Yes	No	No
Staff (e.g. recruitment, absence)	Important	No	No	No	No	No
Logistics/capacity planning	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Other, namely...	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

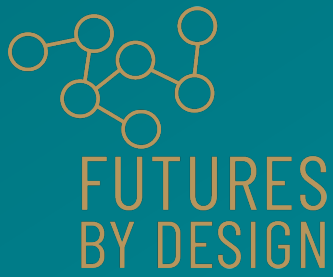
Table 1. Example of a prioritizing overview of the challenges within an organization vis-à-vis its Data Maturity

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