



# PARCEL DISTRIBUTORS' GUIDE TO DIGITALISATION

Including how digitalisation will change your distribution centres for good

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## INTRODUCTION

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# Improve operational efficiency with digitalisation

Industry experts believe that the future of the CEP market belongs to the companies that embrace digitalisation most successfully. In this e-book, you learn why that is and how to structure the digital ascent of your own company.

Running an efficient distribution centre is an increasingly complicated task. With e-commerce on the rise, distribution centres handle a higher number of parcels and an increasing variety of sizes, shapes and packaging. All of it represents a golden opportunity, but it also puts a strain on sortation systems. In this e-book, you will learn about the best, and definitely the

most, cost-efficient strategy for distribution centres to thrive in an age of e-commerce: Digitalisation and data analytics. Through data comes a new level of insight. And through insight comes the power to dramatically increase operational efficiency and throughput.

Enjoy reading.







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# Chapter one: Your fast and efficient guide to digitalisation in the CEP industry

It used to be that optimisation of sortation systems was just a matter of machinery. That is starting to change: A growing number of CEP companies embrace digitalisation as a key instrument to improve throughput at their distribution centres. In this chapter, we bring you digitalisation in the CEP industry 101.



## Here's to creating a smarter operation

Distribution centres always strive to improve throughput. Until recently, however, most of the resources went into the physical side of the operation. Investments in the best sorters, the best conveyor belts, the most effective chutes, and so forth. The physical equipment that makes up the sortation system.

This mindset that machines represent the only way to improve throughput is starting to change though. More and more distribution centres are beginning to ask themselves: What if we optimise how we operate our present system, instead of spending more on new equipment?

The biggest driver in this groundbreaking new approach to optimisation is digitalisation.

### Why the time is now

It is far from coincidental that digital winds are sweeping over the CEP industry right now. The processing power in modern computer technology, combined with sensors, makes way for data-based insights that weren't available just a few years ago.

In today's CEP industry, distribution centres have access to enormous amounts of data. They also often have the processing power to analyse the data. The trick is to connect these two possibilities and use the data-based insights to make crucial improvements to the sortation system and how the sortation system is operated.

That, in short, is the power of digitalisation.

### DIGITALISATION VERSUS DIGITISATION

Digitalisation or digitisation. They're two terms that are interchangeable, right? Close, but not exactly. The concept of digitalisation is actually an expansion of digitisation.

Digitisation means to convert information from a physical format into a digital one. For example, counting the number of unloaded containers at a gate every hour, spanning a week, then entering those numbers into a spreadsheet. That is digitisation.

Digitalisation is to use digitisation to improve a given business process. Like, if you put the numbers from the spreadsheet into an algorithm to determine the most efficient way to allocate operators for next week's production. That is digitalisation.



## It's all about data

When we talk about digitalisation in the CEP industry, we talk about data. Unending amounts of digital information gathered from the sortation system itself and the surrounding hub.

There are two categories of data that distribution centres collect:

- 1) Data about operations:  
How shipments/parcels are processed
- 2) Data about equipment:  
How well the sortation system is operating

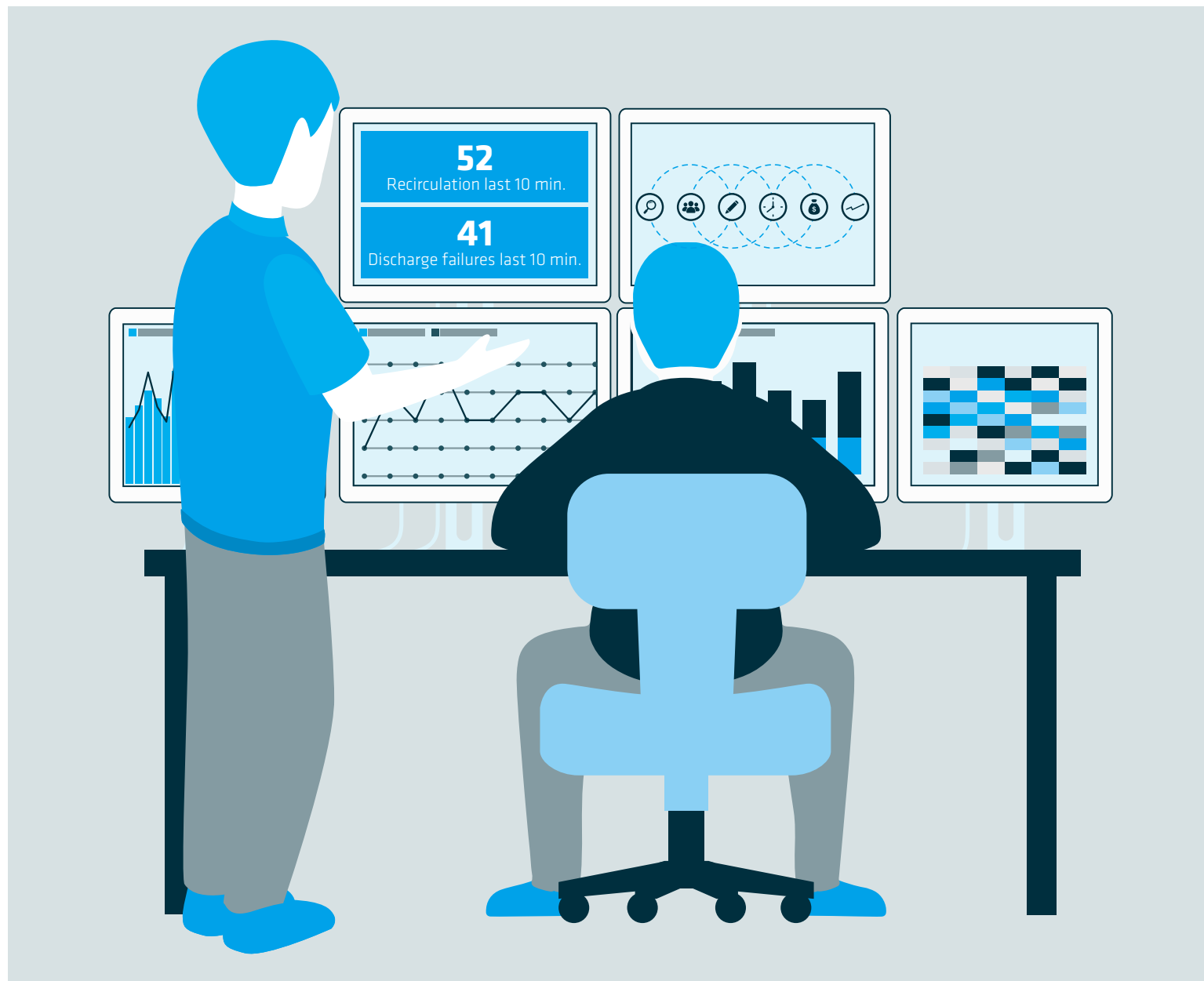
Data reveals how every component of the sortation system operates and how every item is processed. When analysing this data, it exposes patterns in regards to the two overriding subjects: Operations and equipment.

### Like a house of glass

Data analytics might reveal that specific types of packaging are often manually sorted. Or that every time the conveyor belt reaches a specific temperature, a breakdown is likely to follow. The data could reveal that specific vibration patterns from the chutes indicate a lack of machine performance—even after passing the eyeball test.

Instead of information going undetected or simply dwelling inside a single operator's head, the distribution centre can collect and analyse the data to get more insights and pass insights on to more operators.

The output is essentially a transparent distribution centre.



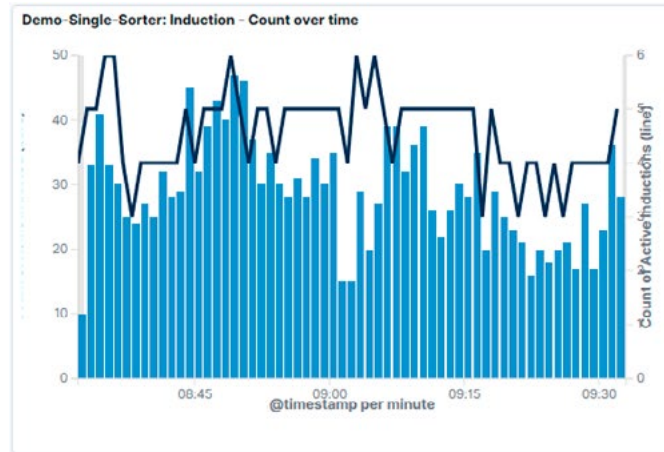
## A deeper look at data gathering

There are several methods to collect data from a CEP distribution centre.

The first option that distribution centres should look into is collecting data from the PLCs inside the sortation system. PLCs are tiny control systems built into the various devices to detect operational and equipment events.

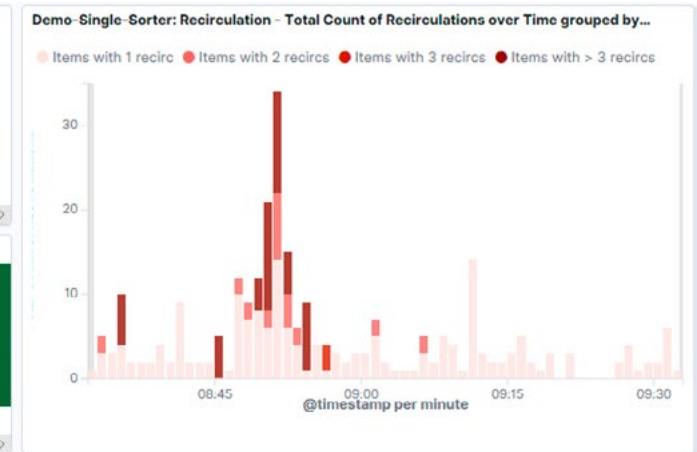
In addition to PLCs, it might be useful for CEP companies to collect data from the system sensors. Typically, this is a slightly more expensive method compared to using existing PLCs. However, sensors are a great instrument if the necessary data points aren't otherwise available. Remember that an important part of data analytics is to gather vast amounts of data, so applying sensors for data gathering in systems with fewer PLCs is an excellent way to build more robust data sets.

Most modern sortation systems come equipped with a high-level controller, which allows companies an easy and efficient way of collecting system data.



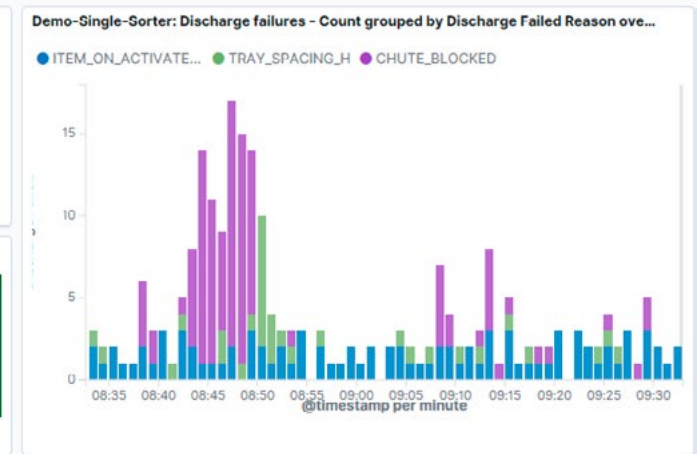
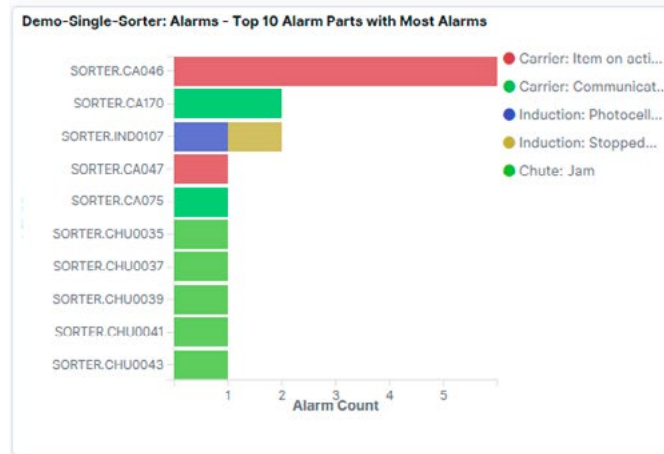
**274**  
Total Sum of Recirculations

**18**  
Recirculations last 10 minutes



**227**  
Discharge failures

**24**  
Discharge failures last 10 minutes







## Chapter two: The five steps to become a fully-fledged data analytical distribution centre

Data analytics at its highest level allows for an entirely transparent material handling operation - including the ability to make real-time adjustments and eliminate any future problem in advance. Before reaching the highest plane of data proficiency, distribution centres need to become comfortable at the four preceding levels. These levels carry a great deal of analytical data value in their own right.



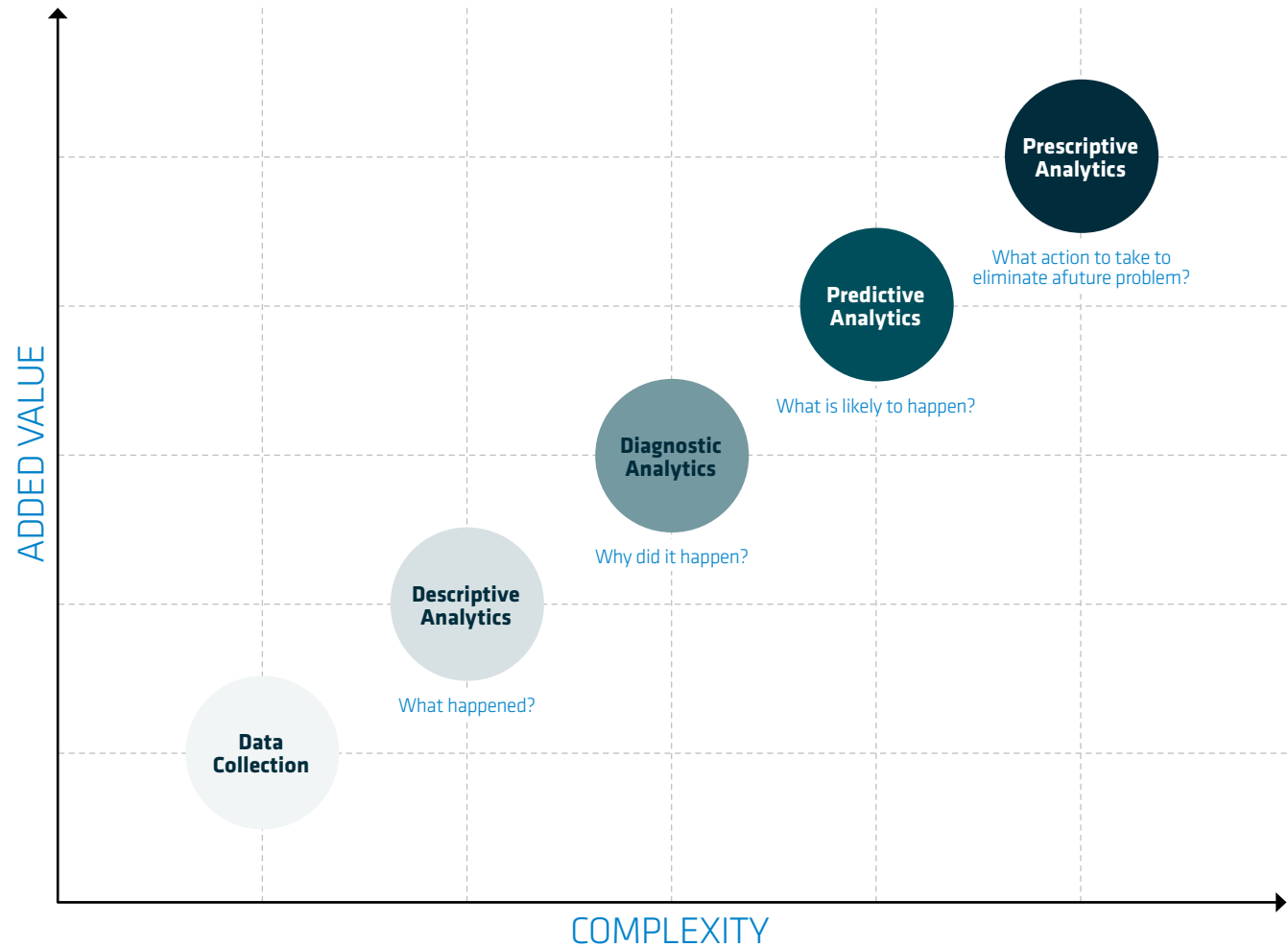
## Introducing five levels of data analytics

Data analytics is not just one thing - taken as an instrument to improve throughput at a distribution centre, data analytics exists on a handful of different levels. Levels that generally are characterised by one straightforward dynamic: Value follows complexity.

Before we get into the five levels of the data analytics ladder, it is essential to note that every level of data analytics carries value in its own right. Data collection, for example, is the most basic form of data analytics, but still represents a significant upgrade to not working with data at all.

Just from gathering data, a distribution centre will achieve insights that would otherwise go unnoticed. At BEUMER Group, we advise distribution centres to work with data analytics at any capacity that is realistic and achievable and build from there.

With that in mind, let's take a look at the five levels of data analytics:



## From data collection to diagnostic analytics

### 1. Level:

#### Data collection

In a conventional data analytics ladder, data collection is often left out of the process. It's understandable if not for any other reason than the act of collecting data not counting as an "analytical" move.

We think it is too important to leave out, though. Gathering the correct data and correct volumes of data are the foundations of successful data analytics. A CEP company should think long and hard about which data it wants to gather as the choice of data pertains to the objectives of the company's data analytics operation. In other words: If your objective is to allocate operators more effectively, then you'll need to gather data that relates to that specific goal.

The distribution centre also needs to consider the available technical structure to gather the data. Is it feasible to collect all the data from equipment PLCs, or is it necessary to incorporate sensors?

### 2. Level:

#### Descriptive analytics

This is the second level of data analytics. Monitoring every part of the system and storing the information digitally. The aim is to answer the most basic question: What happened?

The objective of descriptive analytics is to understand precisely what happened, but not why the event took place. For example, a distribution centre suddenly experiences an

increase in breakdowns. Approaching this problem entails looking at data that covers where the failures in the sortation system took place. Which equipment was affected? At what time did the failures take place? What amounts and types of parcels were going through the sortation system leading up to, and during, the failure.

You could say that descriptive data analytics lays out all the facts retrospectively, but without connecting any of the dots. Almost all distribution centres carry out some form of descriptive analytics.

### 3. Level:

#### Diagnostic analytics

The descriptive analytics level took care of the "what". Diagnostic analytics, the natural next level, adds another piece to the puzzle by also taking care of the "why".

Diagnostic analytics is essentially based on the same numbers as descriptive analytics, but there is a vastly increased ability to analyse data at the diagnostic level. Instead of simply stating what happened, diagnostic analytics compares new data with older data, looks at correlations and identifies patterns. For example, a distribution centre might be able to identify that a combination of volume, parcel packaging and size of parcels might cause specific equipment to falter.

This allows for the management team to make data-based considerations with regards to a better way to structure the sortation process or

allocate operators to maintain a specific flow. Operators can also base their work on data and react when digital predetermined conditions are met instead of only having to react once breakdown occurs.

Diagnostic data analytics is an extremely valuable tool. It remains, though, an instrument based on what has already happened. The final two levels separate themselves by taking data analytics a step further: Analysing what is going to happen.



Gathering the correct data and correct volumes of data are the foundations of successful data analytics.

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## Predictive and prescriptive data analytics

The two most advanced levels of data analytics are predictive and prescriptive data analytics. Where levels 1-3 are concerned with what has already happened and why it happened, predictive and prescriptive data analytics provide actionable insights.

To navigate levels, 4-5 is generally a more technical and complex task than levels 1-3, but the output is also significantly higher.

As a result, CEP companies, that want to work on the highest levels, typically partner with a systems provider that is also a specialist in data analytics and masters the advanced software that comes with artificial intelligence (AI) and the ability to build visual representations of data.

### 4. Level: Predictive analytics

At the second-highest level of data analytics, the question becomes: What is likely to happen?

At the predictive level, data analytics is used as an instrument to forecast: Parcel volumes, parcel mix, peak season volumes, maintenance needs and much more. With a clear understanding of the task at hand, distribution centres get to prepare the best way to operate the system and allocate operators. Not based on assumptions but sophisticated analytics.

Here the analytical method is to couple enormous amounts of data concerning the performance of the system, performance in specific situations, and what is likely to happen.

The use of sophisticated algorithms then makes it possible to predict the optimal use of the sortation system in specific future scenarios — both on an operational and equipment level.

For example, maintenance operators can practice predictive maintenance based on data and real-time performance instead of maintenance based on routines or schedules. A sortation system may go through a performance dip of 5% that no-one would be able to identify from just observing the equipment or the output. With predictive data analytics, no one will have to: Data is keeping them informed.

### 5. Level: Prescriptive analytics

Prescriptive analytics takes looking into the future one step further.

Here the objective is no longer to determine what is likely to happen, but also what actions to take to eliminate a future problem. The data analytics system can foresee future issues, similarly to predictive analytics, and then prescribe a solution for that problem as well.

On the maintenance level, the benefits are knowing which system parts to exchange and when to exchange them. On the operational level, staff would get to know which real-time decisions to make to avoid potential bottleneck situations. On the management level, staff would always know the best way to use equipment, operators and any other resource for that matter.

It is important to remember that there are different levels of autonomy within prescriptive analytics. The system in place can propose an action, inform about an action that should be taken or execute the action autonomously.

Either way, the prescriptive level of data analytics offers a unique opportunity for distribution centres to maintain the highest possible level of throughput consistently.

### HOW TO APPROACH THE DATA ANALYTICS LADDER

It is essential to recognise that the five levels of data analytics represent a ladder and should be approached as such.

Before approaching levels 4-5, a distribution centre should be mindful of completing the previous steps. The first level, establishing an efficient data collecting structure, is the foundation for succeeding at the following levels. Prescriptive analytics stands on the shoulders of the results of predictive analytics, diagnostic analytics on the shoulders of descriptive analytics, and so forth.

The data analytics ladder may appear a tad rigid then, but the distribution centres shouldn't worry. Upon completing a level, it becomes significantly more accessible to operate the next level successfully.



# Chapter three: Still not convinced? The most important reasons why your distribution centre should consider digitalisation

CEP companies utilise digitalisation and data analytics in numerous different ways. The benefits vary in proportions, but they tend to revolve around some of the same themes. In this chapter, we provide a quick and handy overview of the biggest reasons why your distribution centre should work with digitalisation.



## From “what you think” to “what you know”

Digitalisation and data analytics exist on different levels of advancement. What distribution centres can expect to achieve is a data-based opportunity to increase throughput and operational efficiency through equipment and system optimisation.

Digitalisation enables them to:

- 1) Refine operational decisions through data analytics
- 2) Conduct data-driven asset management

Some distribution centres move on to the most advanced levels of data analytics: Predictive and prescriptive. They work with extremely sophisticated algorithms and visualisations that are tailored for specific roles and focus areas at the distribution centres. They even work with digital twins.

Other distribution centres find themselves on an earlier stage of their digital journey. Perhaps on the descriptive or diagnostic level.

The objectives will remain the same for both parties: To move the starting point from “what we think” to “what we know”.



### WHAT DISTRIBUTION CENTRES ACHIEVE FROM DIGITALISATION

Making changes to a distribution centre is not just a matter of machinery. CEP companies can also choose to implement data capture, analytics, and other digitalisation efforts.

#### **The benefits are:**

- > Improved throughput
- > Improved availability of the system
- > Reduced manual handling
- > Less budget spend on maintenance
- > Reduction of incidents

The bottom line: Higher operational efficiency, reduced risk and lower cost per parcel.



## Chapter four: : Digitalisation will become more important in the CEP industry

Distribution centres are expected to process a more varied and voluminous parcel mix, while also juggling more significant variation in their day to day workload. Digitalisation provides a unique opportunity for CEP companies to thrive in an increasingly complicated market with growing customer expectations.



## Why the future belongs to a smarter operation

Running a consistently efficient parcel sortation operation will become more difficult in the coming years.

Some of the key strategic challenges that distribution centres face include:

- > An increased number of peak shopping holidays
- > An increasingly varied parcel mix
- > Customer expectations shifting towards more demanding delivery services in intervals of six or twelve hours, for example
- > A growth in CEP industry competition

All of this amounts to a future where management teams at distribution centres have to become better at forecasting and applying learnings from past production to future production. Otherwise, they will find that it is impossible to navigate in the complexity of the CEP market.

To do this, management teams and operators need detailed and accurate information about past and future production. This is where digitalisation and data analytics comes into play.

Going forward, the distribution centres that thrive will be the ones that embrace digital instruments at all levels of the organisation: Operators, maintenance and management.

Where the technological maturity used to be the deciding factor in CEP industry, at BEUMER Group we believe that digital maturity will be the defining factor for most successful distribution centres.





## Conclusion

### Unlock the power of data analytics

Enormous amounts of value are to be found in data. To start unlocking this value is one of the best ways for distribution centres to improve their present operation and prepare for the numerous business opportunities that e-commerce will provide for the CEP market going forward.

Remember the data analytics ladder: There is more than one way to work with data. Every level of data analytics creates significant value in its own right and provides a platform for advancing to a more sophisticated level of data analytics.





Want to know more about e-commerce logistics systems?  
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