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CONSULTANCY

Ir. Paul Durlinger

## DURLINGER ESSENTIAL ABC-Analysis



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ESSENTIAL

# ABC-Analysis

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## 1. Introduction

So, you have a range of 10,000 Stock Keeping Units [SKUs], a thousand customers and hundreds of suppliers. And you are the one who must determine an inventory strategy for all those SKUs (when to order, how many to order), make a forecast and determine what service level is required. A manager's life is not an easy one!

Fortunately, you may have suitable software; but you probably only have a handful of specialists. How do you ensure that they are working on the right things, and that the master data for the relevant products is correct?

ABC analysis is the prime MT tool to assist you in all these choices and decisions. In this 'Essential' we look at the why of an ABC, decisions the MT has to make regarding the ABC analysis, and the data required. The MT does not have to deal with the actual ABC analysis or calculations, but it must interpret the results and determine policy based on these results.

## 2. Why perform an ABC analysis?

An ABC analysis is meant to distinguish between important and unimportant products and / or customers from an attention point of view. We will devote more time and attention to important products (or customers) and less to unimportant products (or customers).

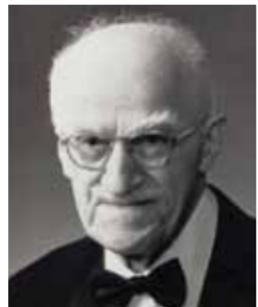
## 3. History

It all started a good 100 years ago when the Italian Vilfredo Pareto discovered that a small section of the Italian population owned most of the land (and thus the wealth). The principle of the 'happy few and the trivial many' was born and lived on as 'Pareto-Analysis'.



*Figure 1 Vilfredo Pareto*

Later on, in the 50's, the Romanian Joseph Juran discovered that 'small' seemed to equal 20% and the 'majority' 80%. Similarly, 20% of the products are often responsible for 80% of the turnover. Hence the name 80:20 rule.



*Figure 2 Joseph Juran*

ABC analysis goes one step further. In a classic Pareto analysis, we see that 20% of the items (A-items) are responsible

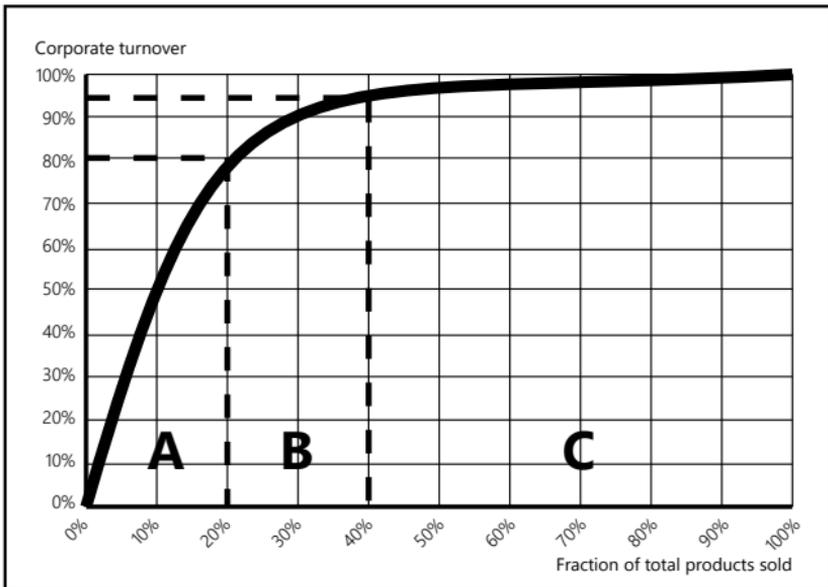


Figure 3 Pareto analysis

for 80% of sales, the next 30% (B-items) for 15% of sales and the remaining 50% (C-items) for 5% of sales, as illustrated in figure 3.

Of course, other distributions are equally possible. 10-70, for example or 25-90. However, a small proportion of the SKUs (the A-items) are always responsible for a large part of the turnover or margin. Strangely enough for outsiders, the reverse is also true: the majority of the items (C-items) contribute virtually nothing.

You might hope that we don't waste much attention on this

C category. Unfortunately, nothing could be further from the truth. In practice, a lot of time is dedicated to those 'unimportant' items. There are so many of them, after all.

The name ABC suggests that we have just 3 classes. However, you can distinguish up to 10 classes if you like, but there will be consequences when we get to interpreting the results! I suggest that the MT distinguishes 6 classes. Class I are the 'Intro' products, that have not been in the assortment for long and must be given time to prove themselves. The MT determines the length of the 'given time' that something can be 'Intro': 3 months, 6 months or a year. These I-products need a lot of attention and should be followed on a weekly basis from the outset to see if they meet expectations (see Durlinger [2019,1]).

At the other end of the spectrum there are the E (exit) products. These are products that have not been sold in the last 12 months, or products that have been assigned 'exit' status. Between the I and the E classes, we also have A, B, C and D; we will cover these classifications in section 6.

## 4. The MT determines the goal

There is more than one type of ABC analysis. The first thing the MT must do is determine why we will do an ABC analysis. The goal may be related to the range, for example: which products are important? Or to the customers: which customers are important? Or to the inventory: which items have the most inventory? Or to the warehouse layout, where should what be stored?

The goal of the ABC analysis determines the fundamental criteria, and which data must be available. For assortment purposes, the total margin per SKU or the number of customers for this SKU could be criteria. For inventory purposes, criteria could be the inventory value or turnover rate, and for warehouse optimisation, for example, the number of 'picks' or  $m^2$  or  $m^3$  per SKU.

In the following sections we will give an example of an ABC analysis for assortment analyses.

## 5. The MT determines the criteria

The MT determines the criteria that are to be used for the ABC analysis, and therefore also the data required. We can make several suggestions in this connection. When looking at the goal of a company, making money, margin is a logical criterion. We don't mean the margin per product, but instead the total margin for an SKU over the last 12 months. Not to make things too complicated we will look at the gross margin, defined as:

*(total sales in £ - total purchases in £) per SKU.*

Similarly, we could look at the total turnover, or the number of customers per SKU, or we might be interested in the number of orders per SKU over the last 12 months. The main thing is for the MT to think about why these criteria would be of interest.

## 6. The MT determines the boundaries

Suppose the chosen criterion is margin. When is an SKU an important (A) article on the basis of this criterion? This is a bit subjective. In company A the MT might say: if the total margin for an SKU is greater than £100K we will consider it an important (A) item. If the total margin is less than £100 we consider it an unimportant (C) item. But in company

But an article might be labelled as A if the total margin is > £25K. As said, subjective, but we can always adjust these boundaries.

Later on, we will see that the actual ABC analysis, the technique, is not so difficult (Durlinger [2018]). It shouldn't be a problem for your data analysts. The real problem, as mentioned earlier, is the interpretation of the results. And this is a job for the MT. I will get back to this interpretation in paragraph 9.

For now, I can show the results of a practical example in figure 4. In this example, the top 11% of SKUs accounted for 40% of the margin: at the other extreme, the final 25% of SKUs accounted for only 2% of the margin.

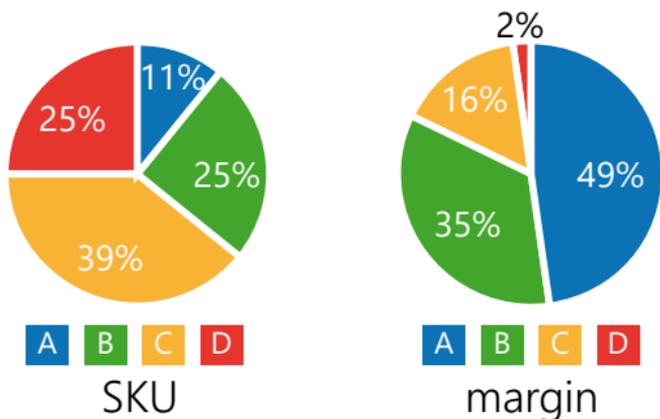


Figure 4 A real-life example of SKUs and margin

## 7. How many A-items?

The key question is always the same: how many A-items should a company have? We have said we must spend time on A-items, on a monthly basis. After all, they are our money-makers. Let's assume that a planner needs fifteen minutes per month per A-item. In that case we think that a planner can handle about 200 to 250 A-items in addition to his other work. That may not seem many, but we are talking about the products that contribute most to our profit. Alternatively, we could pay more attention to the top 500 on the basis of margin. We will have to start somewhere, after all!

In our example, the top 500 products (just 0.3%) were responsible for 25% (!) of the margin. And this type of distribution is not exceptional. But then there is the other end of the spectrum: C-items.

## 8. 25% of the items contribute nothing!

According to classic Pareto analysis, 50% of the products contribute just 5% of the total margin. One could say: "it's still 5%". But if we perform an ABC analysis on the C items, a completely different picture emerges. In our example, we looked at how many SKUs are responsible for the last 1% margin. That turned out to be 35% of the SKUs. So, 0.3% of the SKUs provide 25% of the margin, while 35% of the SKUs only add 1%! And these numbers are not exceptional. The end of the long-tail is not a pretty sight.

## 9. Role of the MT in interpretation

ABC analysis reveals which items require a lot of attention (A-items, or the top 500), and which ones we should ignore (C-items). The brother of the ABC analysis, the Incremental Margin Analysis (Durlinger 2019, 3), indicates which SKUs have a negative net margin contribution.

However, the MT may have other reasons to include SKUs in the assortment, even if they do not yield anything. But they shouldn't receive much attention. Examples might be very simple inventory strategies and forecasting techniques. In this context, the customer is also important. We will pay attention to this in the next paragraph.

## 10. A two-dimensional ABC analysis

Often it makes sense to include two criteria in an analysis. This is called XYZ analysis. For example, we can also look at the number of customers who purchase a certain SKU. This would lead to something like Table 1.

		Margin (in £)		
		A	B	C
Number of customers	A	X	X	Y
	B	X	Y	Z
	C	Y	Z	Z

*Table 1 XYZ Analysis*

If an SKU with a large total margin is only sold to one or two customers, there are risks involved (if we were to lose a customer) but also opportunities (better forecasting possibilities through better coordination and cooperation).

But if we only supply poorly performing products to poorly performing customers, cleaning up your customers and products is certainly also an option. In retail environments this could be an indication not to deliver these items from stock. They are likely to be expensive, exclusive items that a customer is willing to wait for. But as always, it's up to the MT to determine what to do.

## 11. ABC analysis and inventory in S(I)OP

We can also easily include ABC analysis in the Sales (Inventory and) Operations Planning [S(I)OP] process, to get an indication of the quality of the inventory. (Durlinger, van Dieren [2019.4])

It is of course also of interest to know where all the various items are, and we can hope that the inventory distribution is somewhat in line with the turnover or margin distribution. That means that the majority of the inventory is in the A-products and that there is 'little' in the C-products. This ratio indicates how well the inventory strategy (Durlinger [2019.4]) works.

We can also see this in the ABC analysis. In figure 5, we give a comparison between the number of SKUs, the margin and the stock.

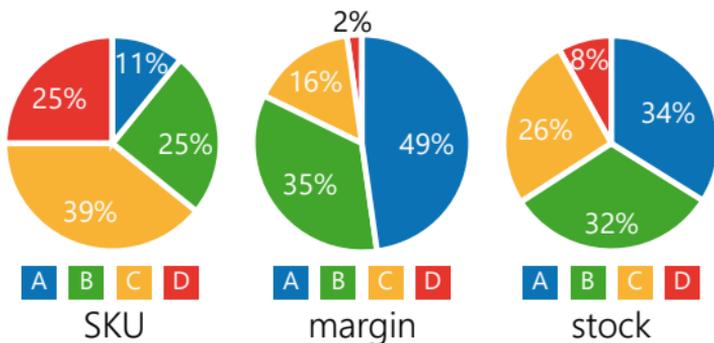


Figure 5 Percentage SKUs, margins and stocks

## 12. The MT sets the priorities

Of course, the data required for making an ABC analysis depends strongly on the desired analysis. But normally nothing difficult is necessary and the data can be extracted from any software package. But you, as MT, must set priorities.

We are often told that time is a problem. However, a good ABC is the basis for inventory management, forecasting, assortment management and even for your SLOP if you are a wholesaler / distributor!

## 13. Literature

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Paul lectured at several universities and has twenty years of experience as a senior consultant. He sees it as his mission to make difficult concepts readily understandable.

He is also attached to the Slimstock Academy.





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