

Data Analytics 2 - Market Basket Analysis

Tuomo Kareoja

Version Number	Changes	Date
0.5	Basic structure, some text and plots	16.09.2019

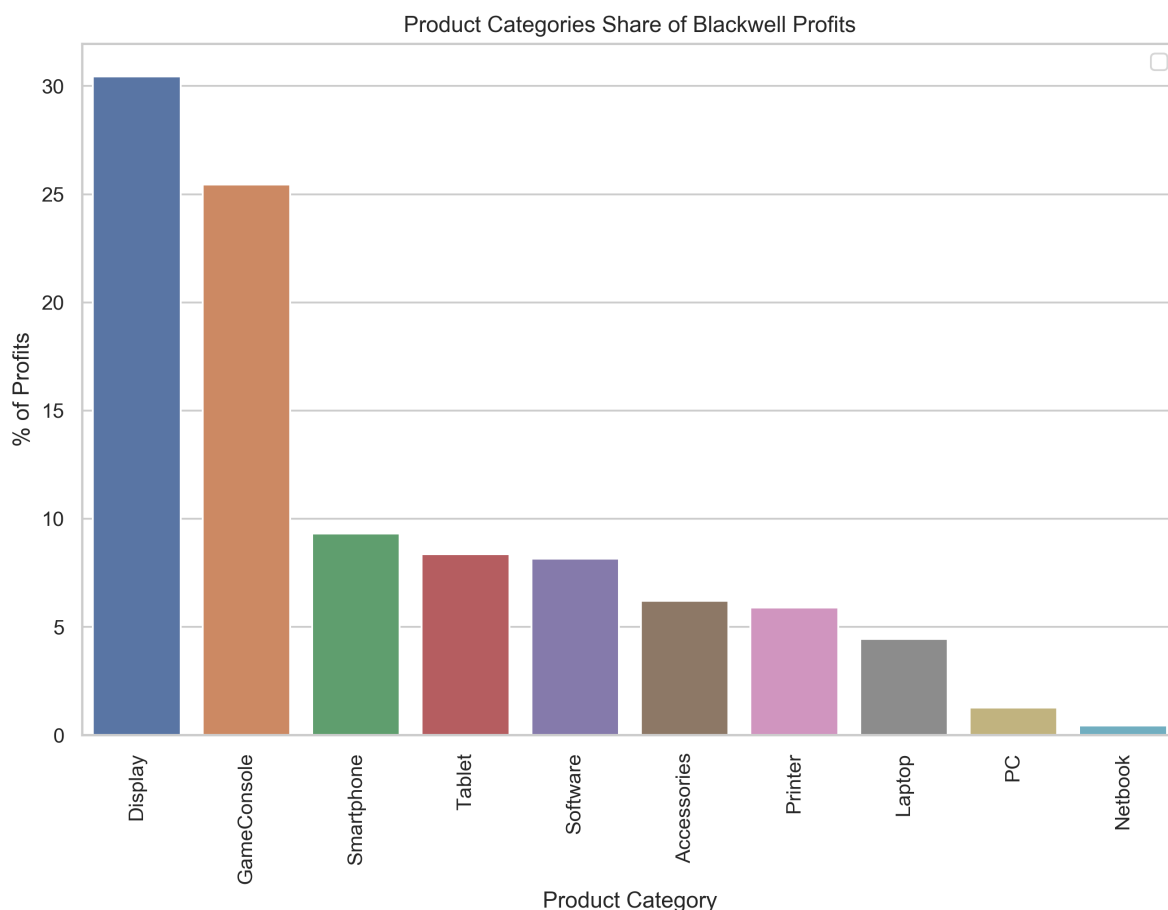
Main Takeaways

1. Although in most product categories Blackwell and Electronidex fit together nicely by offering products in different categories or product in different price ranges, with PC:s, Displays and Tablets there is considerable overlap. This is worrying as these 3 categories create 45 % of Blackwells' profits.
2. Electronidex has a huge portfolio of over 4000 products and as there are only slightly over 10000 transactions with more than 1 unique product, it is hard to find reliable connections for buying certain products together.
3. If we add the product brand to the analysis, the results are still weak. The one interesting thing in this level is the way that apple products are often bought together with other apple products. Apple is also the most popular brand in transactions, being over 2 times more common than the next one which OWC (who make Apple accessories).
4. If we perform the market basket analysis at level of product categories, we find interesting connections between buying smartwatches, cameras and products of category other (these include a number of different products e.g. lamps with usb ports for charging other devices, connected thermostats etc.) and buying products belonging to the most profitable categories in Blackwells' product lineup: displays, tablets, pc:s, laptops, smartphones, printers and software. These associations offer strong cross selling possibilities as Blackwell does not itself offer any products in the predictive categories. Unfortunately these rules cover only 2.7 % of the multi-item transactions and only 0.6 % of all transactions. This means that although these rules are can find a subset of transactions for cross sales, these transactions are quite niche and their total monetary value is questionable
5. For better analysis of we would want to have information about the individual profitability of different items in Electronidex product lineup

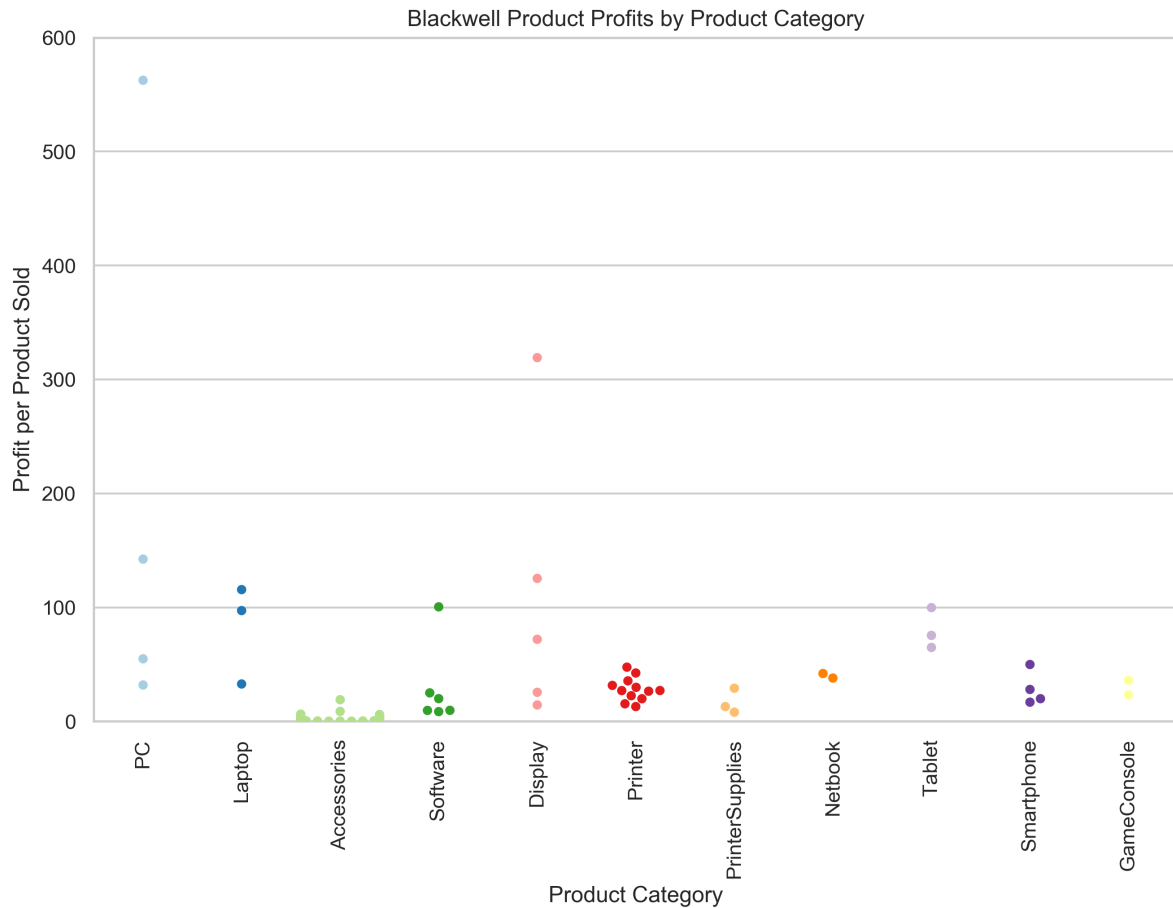
Blackwell Product Line Comparison to Electronidex Product Line

Blackwells' two most profitable product categories are displays and game consoles. These two groups create 55 % of Blackwells' profits at the moment. After these two groups there are 6 product groups that also contribute substantially, but that are not individually on the same level of importance as the two biggest categories. These products create 41 %

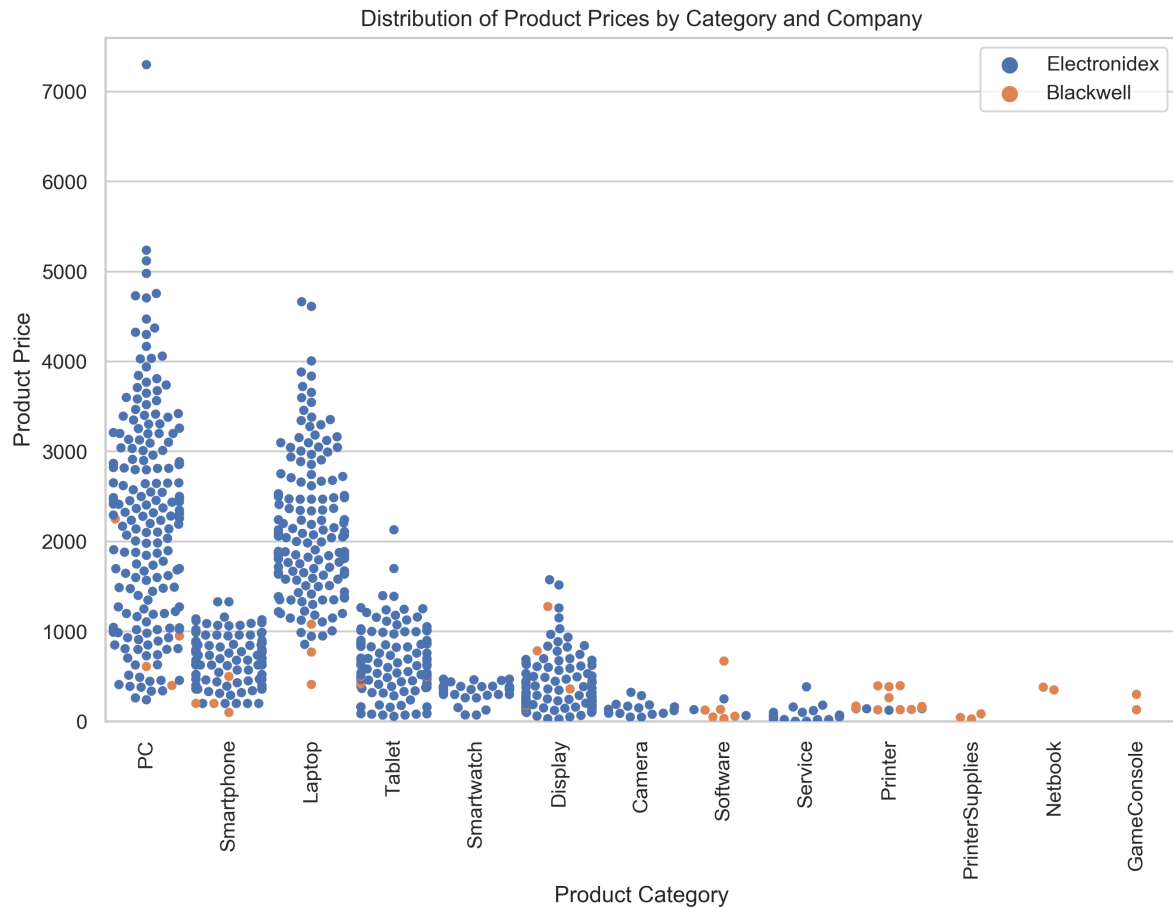
of our profits. Below is a breakdown of our profits by percentage by product category. Extended warranties are not included in this plot as the data that we have from them is suspicious as it seems to have copy pasted values between different warranties.



Next we look at the profits created from individual sales of our products. Below are plotted are our available products sorted to product categories with their profit created per sold unit on the y-axis. We see that our profits per product are actually quite consistent except for accessories and one very high profit product in PC:s and another in Displays. By comparing these to the breakdown of our profits per category we can come to the conclusion that to diversify our profit making increasing our sales of PC:s, laptops, software, printers, tablets and smartphones would be advisable. Especially PC:s, Laptops and Tablets offer big profits per sold product. We keep this in mind when looking at what Electronidex has in their product lineup.



Next we see how our product lineup matches that of Electronidex. Below is a plot Blackwells' and Electronidex product by product categories with their list prices (in Electronidex case we used the median price of sold items to take into account how often there are discounts or other variation that might skew the real price away from list price). Accessories have been left out of this picture as there are too many products to visualize properly. Suffice to say that in this category there is considerable overlap if we look at just the price and category, but accessories is a difficult category as often these are related to just certain products and in these cases if our products are not exactly the same there will be no overlap. Because of this reason we have left accessories out of the following analysis.



We see that Electronidex has a very large product lineup that dwarfs ours. Going through each category we can divide the categories into ones that have little or no overlap, ones that have overlap, but our products are differentiated by price, and ones where there is considerable overlap:

No overlap: smartwatch, camera, software, service, printer, printer supplies, netbook, game console

Overlap, but different prices: smartphone, laptop

Overlap, no price difference: PC, tablet, display

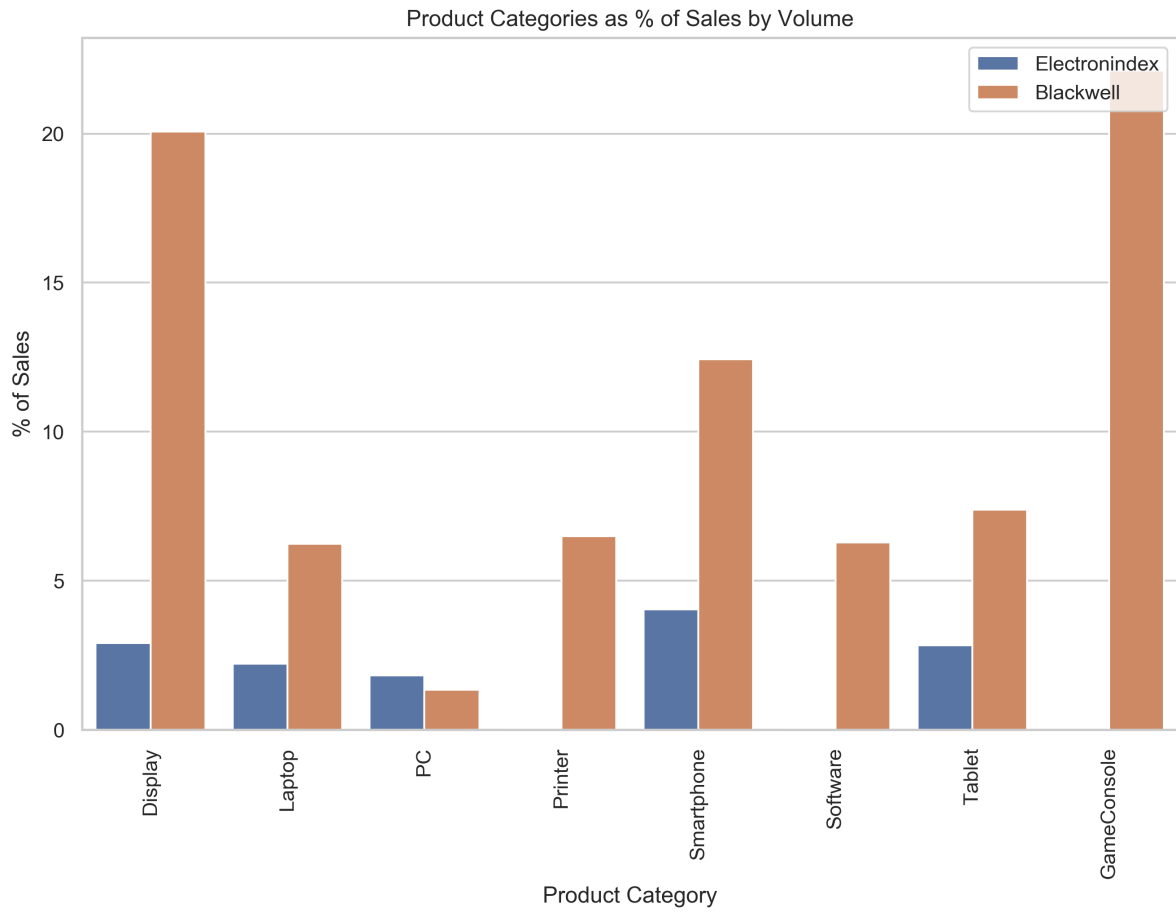
The categories that don't overlap and that have don't have any offerings from Blackwell include smartwatches, cameras and services. These are product categories that would just extend our lineup if we acquired Electronidex. The product categories that we have

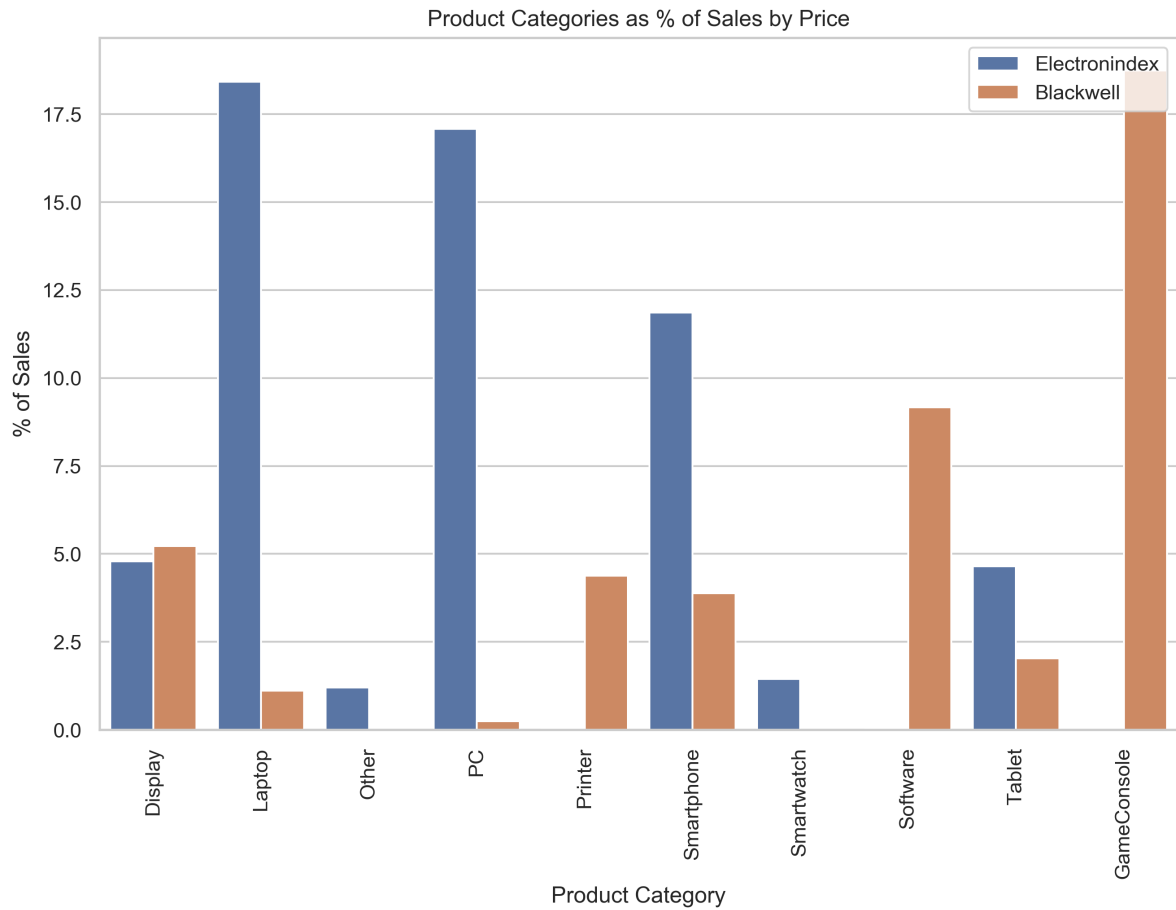
offering and Electronidex has none or only few include software, printers, printer supplies, netbooks and game consoles. These product categories would not need to compete with Electronidex offering and could benefit from cross-sales. These categories make up 40 % of our current profits.

The categories that have overlap, but where there is a price differentiation include smartphones and laptops. In both of these categories our product add more options to the lower price range of these products. With laptops our priciest model has similarly priced offerings from Electronidex product range but our two lower end products would form a new low end offering to the combined product range. This is true somewhat also with smartphones where our cheapest phone is cheaper than any offering from Electronidex, but our other offerings would be less clearly differentiated. Not including our highest end phone, this could still be ok, as the low end offerings from Electronidex are more limited than the midrange offerings and our products would change this. These two categories constitute 13 % of our profits.

The categories where there is substantial overlap are PC:s, tablets and displays. Here our products don't differentiate themselves from Electronidex offering by price. This means that our products would possibly compete for the same customers. These categories form 40 % of our current profits.

Blackwell and Electronidex sales by product category



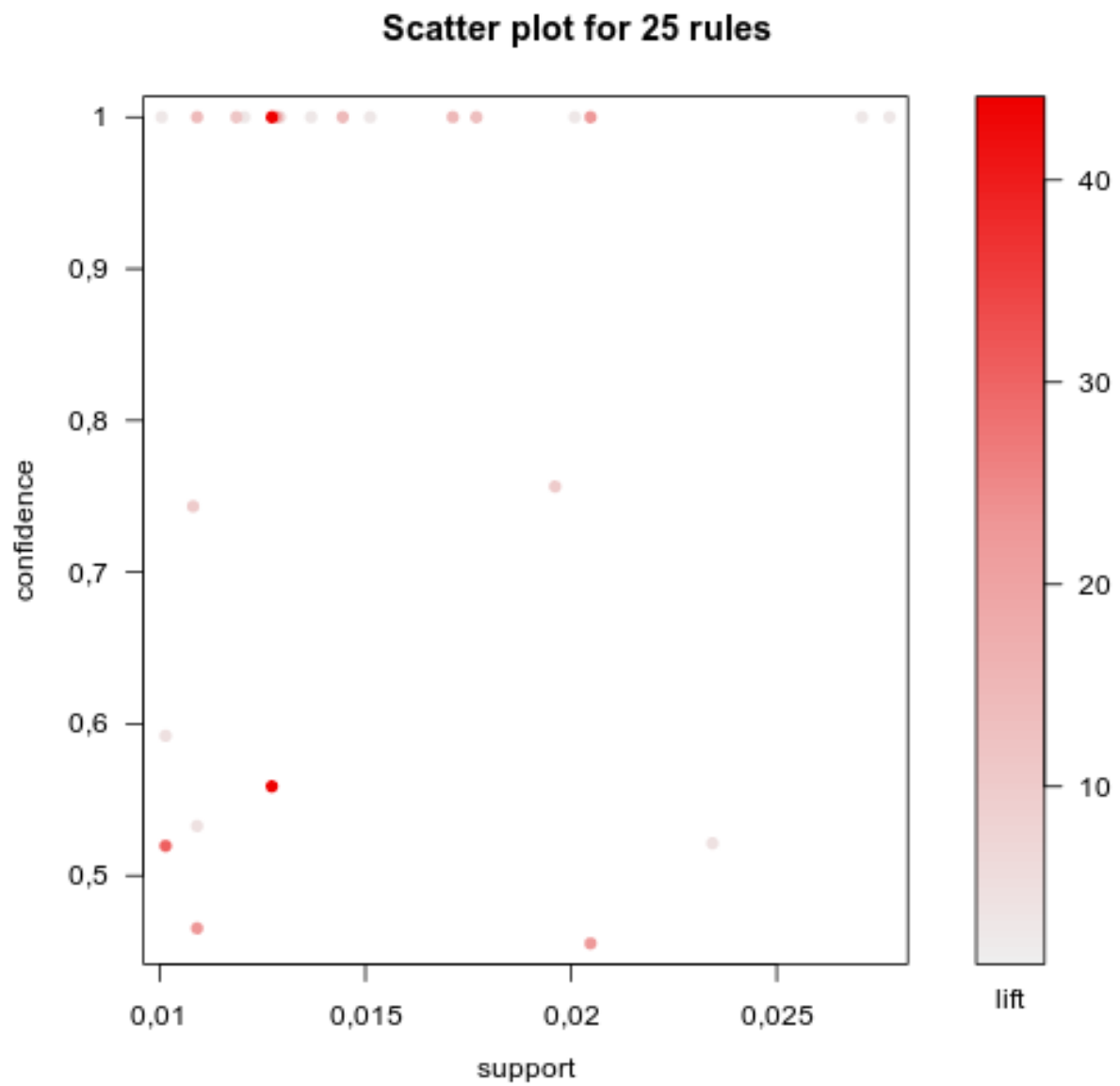


Market Basket Analysis of Electronindex Transactions

Product Level

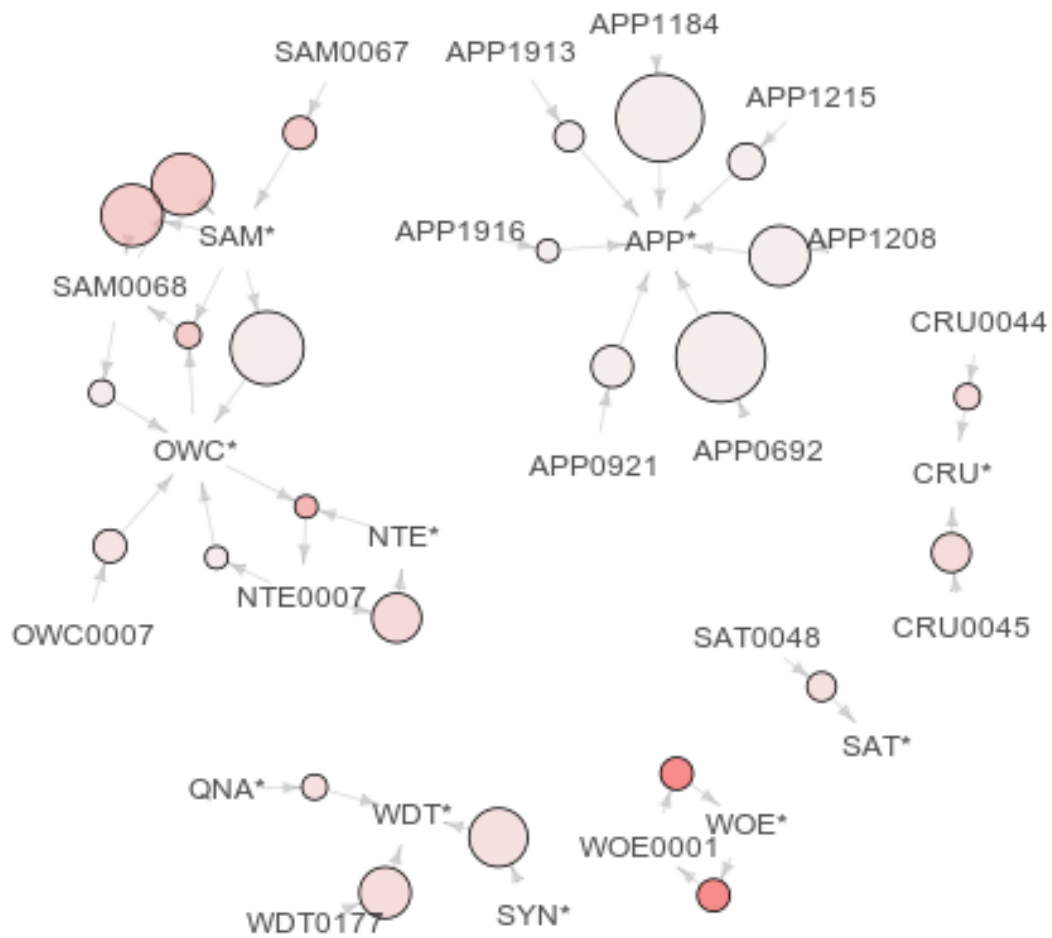
This does not work

Brand Level

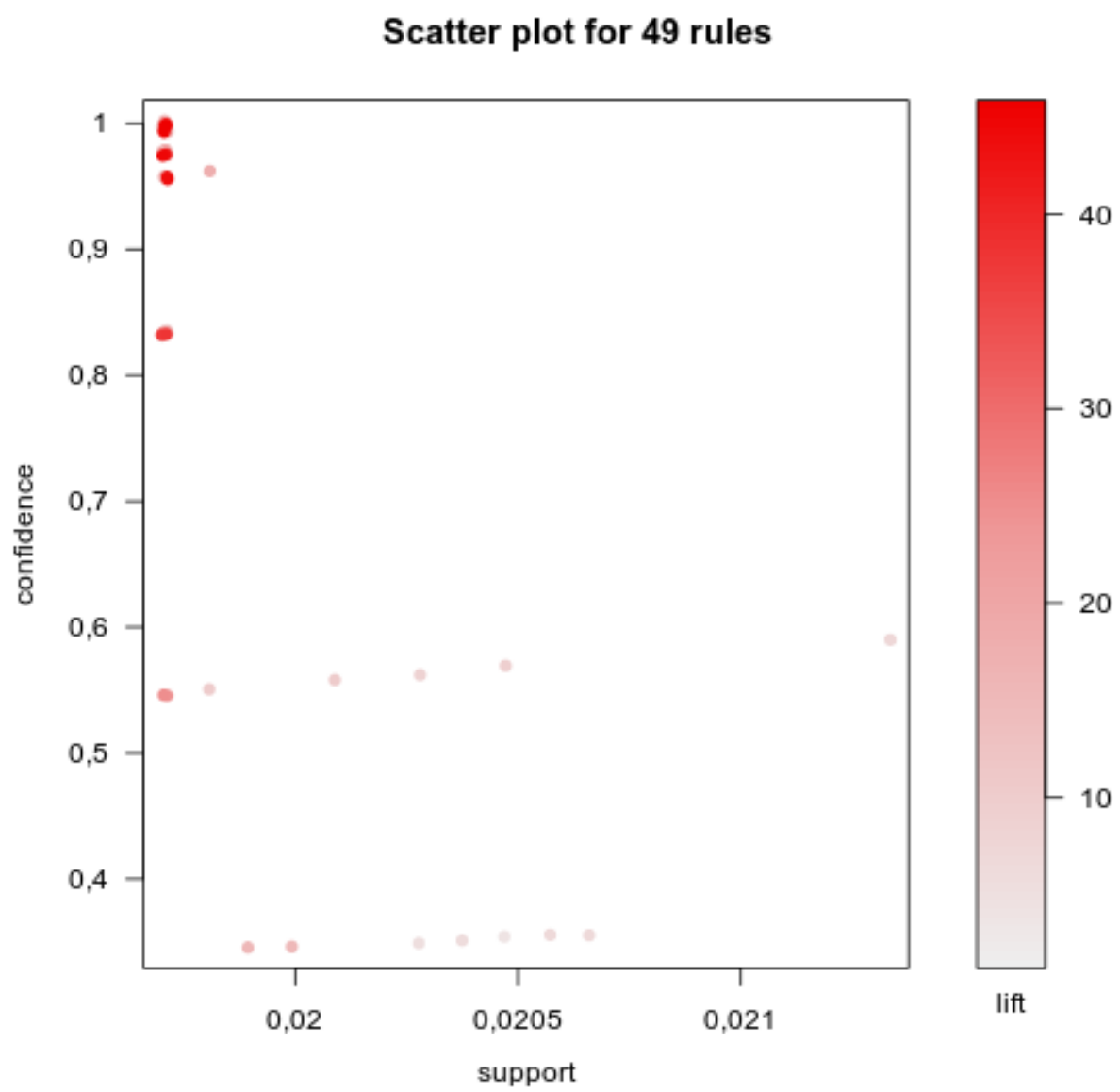


Graph for 25 rules

size: support (0,01 - 0,028)
color: lift (2,737 - 43,92)



Product Category Level



Graph for 49 rules

size: support (0,02 - 0,021)
color: lift (4,117 - 45,646)



Suggested Next Steps

Some text