

SHOULD BLACKWELL ELECTRONICS ACQUIRE ELECTRONIDEX?

**A study of Electronidex's
customer behavior through Market
Basket Analysis techniques**

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Addressed questions:

1. How do Electronidex's customers behave?
2. What items should Blackwell add to its catalog?
3. Which strategies would help increase Electronidex's online sales?
4. Should Blackwell acquire Electronidex?

Our team has used Market Basket analysis methods to get better insights on these issues. This method allows us to see which items are usually bought together and how frequently this happens.

Electronidex Customer Behavior

We used Electronidex data containing information on about 10.000 transactions, all done in the time-range of a month.

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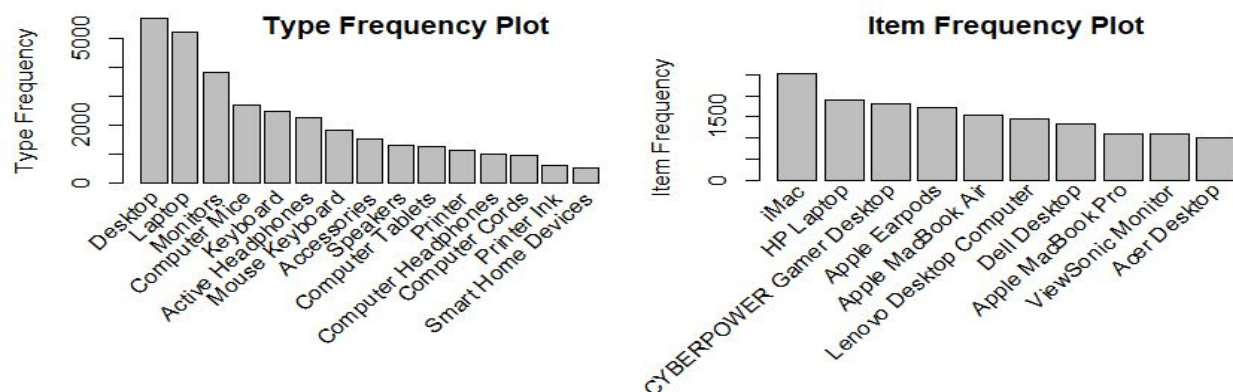
items
[1] {Acer Aspire,Belkin Mouse Pad,Brother Printer Toner,VGA Monitor Cable}
[2] {Apple wireless keyboard,Dell Desktop,Lenovo Desktop Computer}
[3] {iMac}
[4] {Acer Desktop,Intel Desktop,Lenovo Desktop Computer,XIBERIA Gaming Headset}
[5] {ASUS Desktop,Epson Black Ink,HP Laptop,iMac}

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(i) Sample subset of our data. Each row represents a transaction.

Electronidex sells a total of 125 different products, and a total of 17 different product types:

- The most popular products are the *iMac* (present in 25% of the total transactions); followed by the *HP Laptop*, the *CYBERPOWER Gamer Desktop*, the *Apple Earpods* and the *Apple MacBook Air* (all more than 15%).
- Also, contrary to Blackwell's case, Electronidex customers are especially interested in buying *Desktops* (present in 60% of transactions), *Laptops* (50%) and *Monitors* (40%).



(ii) Most sold products and Presence in transactions.

Types of customers: Electronidex has two types of customers. Some purchases fit the profile of an *individual's* needs, while others combine different types of Desktops, Laptops and Monitors. The second type of purchase shows that these clients must be **companies or big organizations** buying in bulk.

PURCHASES MADE BY A BIG ORGANIZATION		PURCHASE MADE BY INDIVIDUALS
{Acer Desktop, Intel Desktop, Lenovo Desktop Computer, XIBERIA Gaming Headset}	{ASUS Desktop, Epson Black Ink,	{Acer Monitor, Apple Earpods, CYBERPOWER Gamer Desktop}
	HP Laptop, iMac}	{Dell Desktop, HP Wireless Mouse}

(iii) Different nature of purchases.

What products should Blackwell add to their catalog?

- Product types that Blackwell doesn't sell and that have a lot of success in Electronidex, such as **Speakers, Keyboards, Mice, or Active Headphones**.
- Specific Desktops, Laptops and Display products which are also not included in our catalog and are present in high percentages (more than 15%) in Electronidex's transactions: **iMac, CYBERPOWER Gamer Desktop, Lenovo Desktop Computer, Acer Desktop, HP Laptop, Apple MacBook Air, Apple MacBook Pro, ViewSonic Monitor and Asus Monitor**.

Market Basket Analysis

On average, customers buy between 4 and 5 products on each purchase. Because of this, it makes sense to look for products that are usually bought together. Through Market Basket Analysis we find rules such that:

If X is bought → Higher Probability that Y will be bought

We have found relations involving 2 to 4 items. Figures (iv) and (v) show some important rules for Product Types and for Single Products. Each path shows a possible recommendation^{1 2}. For example, in Rule 2 of single products:

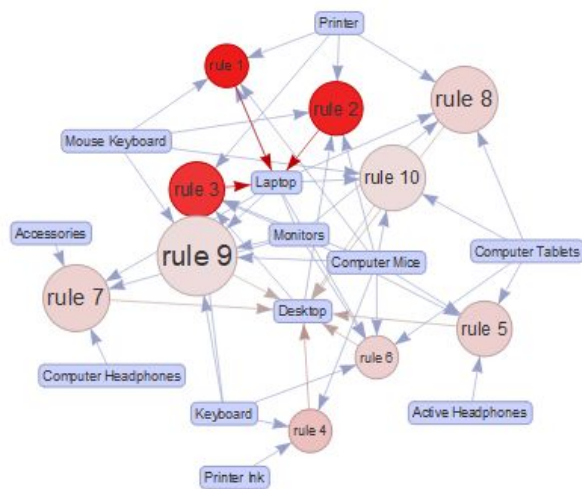
If Dell Desktop & ViewSonic Monitor are put in basket → Recommend HP Laptop

¹ For single products, all relations have lifts between 2-3. This means that once the products entering the rule have been bought or put in the basket, it is at least 2-3 times more likely that the products that come out of the rule are bought as well. It is also filtered in a way that at least 1 out of 4 customers will fulfill this rule.

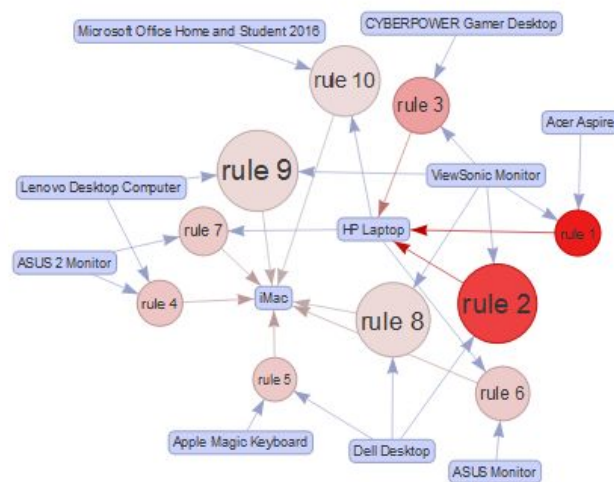
² For product types, the lifts are the same but this time 1 out of 2 customers will fulfill this rule.

In all of our rules, we have got as recommendation the most sold products: **HP Laptop, Dell Desktop, CYBERPOWER Gamer Desktop, Lenovo Desktop Computer and ViewSonic Monitor**. For the product types we get the same results: **Laptops, Desktops and Monitors**³. In the Appendix there's more rules with which we can build **more recommendations that involve different products**. In the Appendix there's also a **special set** of products that have very high correlations (90-100% of times products are 7-10 times more likely to be bought) but very low probability of happening. For this, they could be promoted in a special way, such as special packages.

Finally, most Rules can be used for big organizations. Still, some rules -for example Rule 1 on the left- could be applicable for both organizations and individuals.



(iv) Relations between product types



(v) Relations between single products

What can we do with this?

- **Cross-Selling/ Recommendations:** Identify customer type and make suggestions based on the rules we have whenever the user is building his or her basket.
- **Targeted promotions:** Special promotions through emails, app notifications, SMS or on-site promotions (when the user logs in) with products that might interest the customer based on previous transactions.
- **Targeted marketing:** Market specific products to specific customers through social media, apps and filtered newsletters based on previous transactions.
- **Special packages:** For the special set combinations that contain 4 or more products, make special packages that can be sold together.

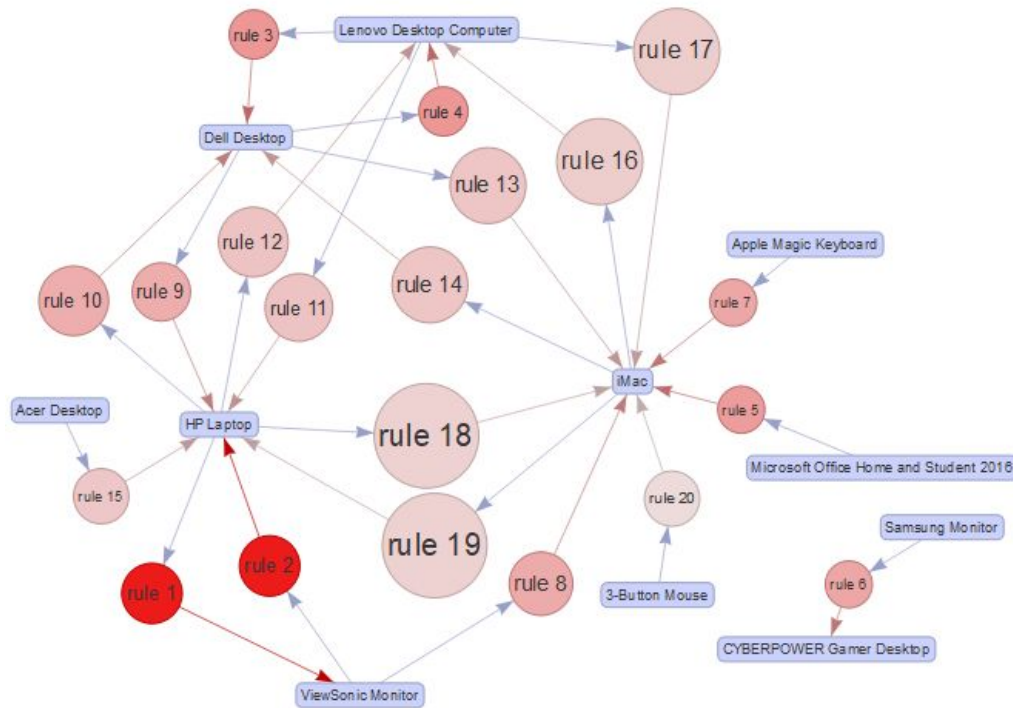
³ This is because they are the most sold products/ product types.

Blackwell should acquire Electronidex. Why?

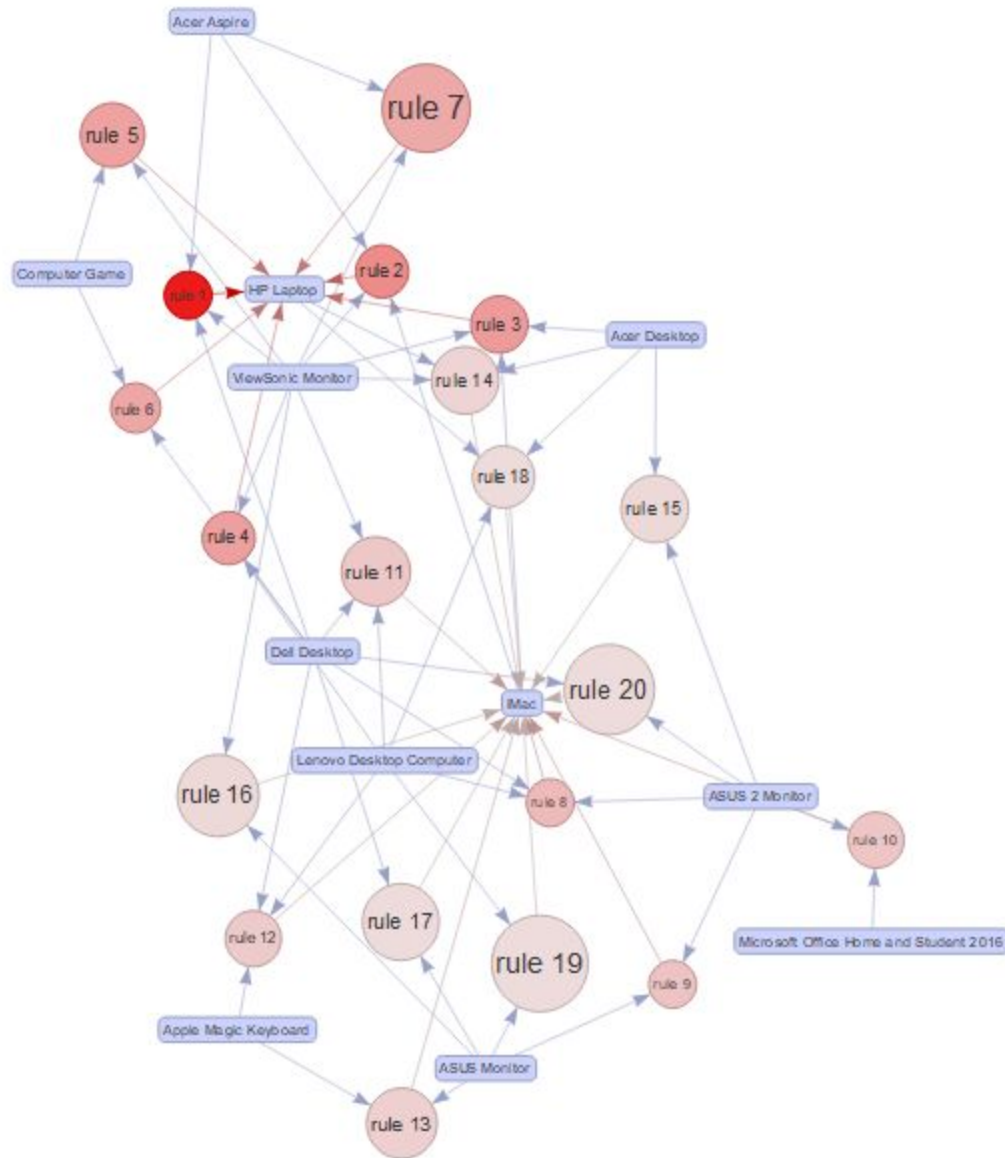
- **Electronidex's customer base complements ours.** Their customers buy many product types that ours don't (mainly PCs, Laptops or Display). Therefore, acquiring Electronidex would increase our customer base and their interests. This would increase profits a lot given that these products are providing the top 3 highest average profit per unit in Blackwell (200 for PC, 110 for Display and 80 for Laptop).
- **It would expand our product type offer:** There's many product types that Electronidex is selling well that are currently not in the Blackwell catalog: **Headphones** (Apple Earpods are the 4th most sold product), **Keyboards** and **Mice** (3 more products in the Top 15), or **Speakers**.
- **Their Volume sales are high:** The number of sales is in the same range as Blackwell's average (between 1000 and 2500).
- **Electronidex customers buy in bulk:** In our study we cannot know if more than one of the same product is being bought. Still, given the combinations of products, we suspect that more than one Unit of each product is being bought each time. This would increase Volume and revenue even more.

Rules to be used for recommendations, promotions and marketing purposes.

Set 2: These rules are made by sets of products that represent around 4-7% of the total purchases. 30-50% of customers buying these products are 1.5 to 2.5 times more likely to buy the final product. Here iMac, HP Laptop, ViewSonic Monitor, Dell Desktop, Lenovo Desktop Computer and CYBERPOWER Gamer Desktop are the recommendations.



Set 3: These rules are made by sets of products that represent around 0.05-0.1% of the total purchases. 60-80% of customers buying these products are 2.5 to 4 times more likely to buy the final product. Here iMac and HP Laptop are again the recommendations.



Special sets:

These sets are likely to be bought from 6 to 10 times more by 90-100% of the customers. On the other hand, these combinations contain a lot of products and are not very likely to happen (they only represent 0.01% of our dataset). Because of this, these special sets can be promoted differently (for example, as special packages). Here Dell Desktop, Lenovo Desktop Computer and ViewSonic Monitor are the recommendations.

