



Blackwell Electronics

Electronidex basket analysis

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AGENDA

- **General Overview**
- **Electronidex basket analysis:**
 - Analysis by category of product
 - Analysis by product
- **Blackwell & Electronidex: M&A insights**
- **Conclusion & Recommendations**
- **Appendix**

GENERAL OVERVIEW

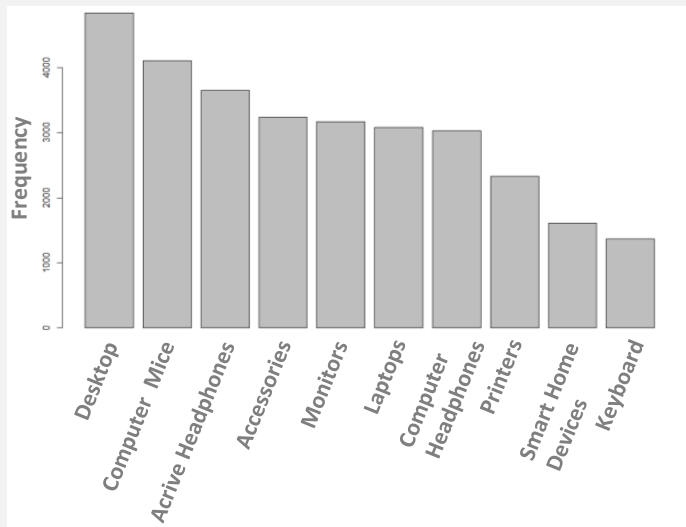
Description of the dataset

The dataset contains **9.833 observations** representing the **online transactions** made by Electronidex's customers over a one month period (**30 days**). The catalogue contains **125 products** that customers can choose among, which can be **grouped** into **15 product categories**, namely: Laptops, Desktop, Monitors, Computer Mice, Keyboard, Mouse and Keyboard Combo, Computer Headphones, Active Headphones, Accessories (containing cables, computer games, mouse pad, Microsoft Office package), Speakers, Printers, Computer Stands, Computer Tablets, External Hard drives and Smart Home Devices.

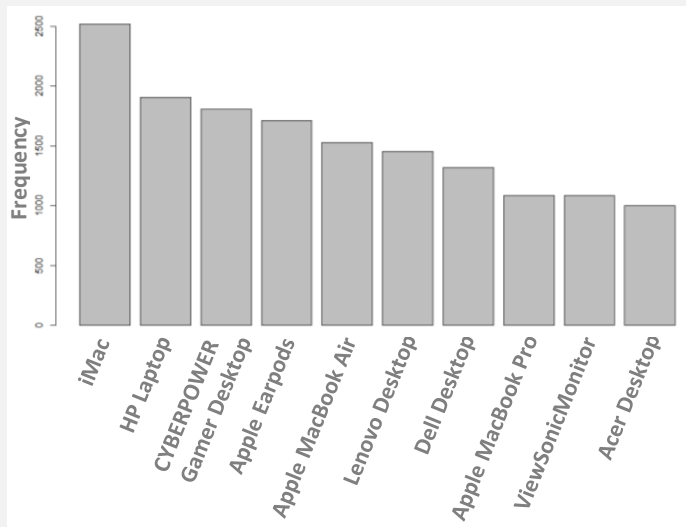
Objective of the analysis: perform a market basket analysis to better understand the client base that Electronidex is currently serving and advise Blackwell if this company could be an optimal target for the M&A activities

A first overview of the data can be found below:

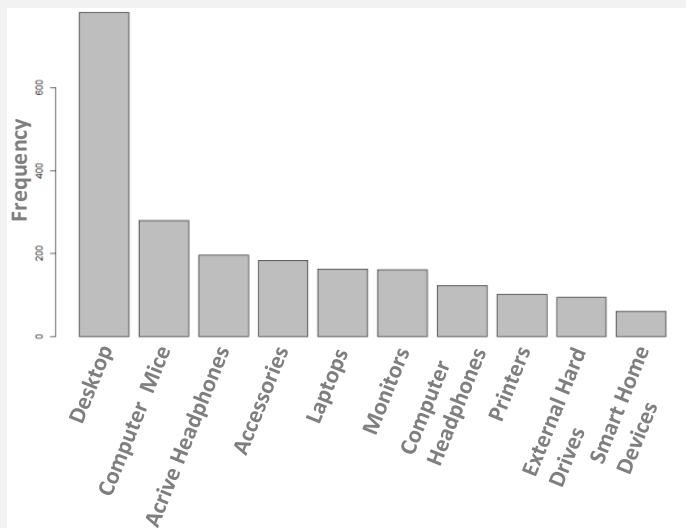
TOP 10 CATEGORIES by FREQUENCY



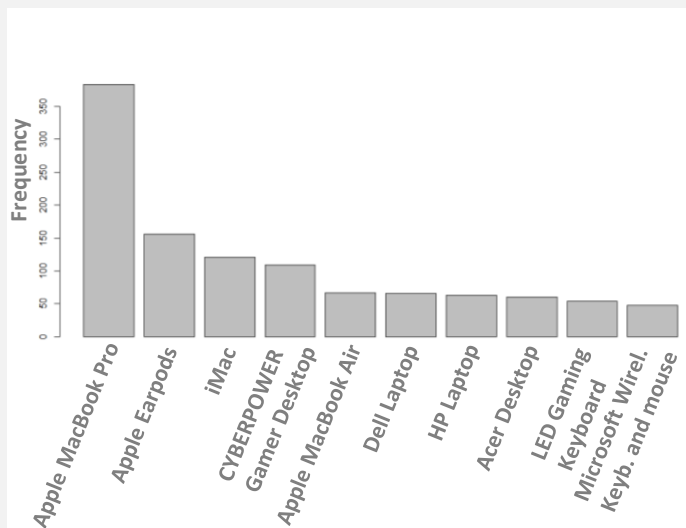
TOP 10 PRODUCTS by FREQUENCY



TOP 10 CATEGORIES PURCHASED ALONE



TOP 10 PRODUCTS PURCHASED ALONE



From a preliminary analysis of the data, it appears that the **“desktop” category** is the **most frequent** across Electronidex’s transactions. Indeed, by taking a closer look at the best selling products, **the top 10 list** comprises **five desktop PCs**, namely: iMac (in ~ 2.500 transactions), Cyberpower Gamer Desktop, Lenovo Desktop, Dell Desktop and Acer Desktop. The following most sold categories are Computer Mice, Active Headphones, Accessories and Monitors, that is categories of products useful for “completing” a PC. Finally, another important category in Electronidex is **“Laptops”**: the **top 10 list** of sold products contains **three different type of laptops**, two Macs and another one from HPs.

Looking at the **categories** and **products purchased alone**, the results are roughly the same: **Desktop and Laptops** are among the **most frequent** categories, but in this case the laptop **Apple Mackbook Pro** is the **most sold product** appearing alone in more than 350 transactions. The iMac PC is third in the classification with approximately 125 observations.

Across the data, the **average number of different products per cart** is **4,4** , but in this case the **best measure of central tendency** is the **“mode”** which, when calculated, shows a **decreasing trend** (Appendix Fig.1): purchases with **only one distinct bought item** are the **most frequent** (>2.000), followed by two items, three items and so on. The largest basket is composed by 30 different products, but it appears just once over the entire month.

ELECTRONIDEX BASKET ANALYSIS: Analysis by category of product

In order to discover interesting insights within Electronidex customer’s transactions and understand whether to proceed or not with its acquisition, a **market basket analysis** has been **performed** by analysing the transactions data at **two different levels**: by **“category of product”** and by **“product”**.

In the analysis by category of product, different sizes of basket in terms of distinct purchased products are analysed:

- **Small basket** → few product categories: when customers buy products just from two or three distinct categories, it is much more likely that they buy “only accessories” like headphones, speakers, mice, keyboards, monitors etc. (Appendix Fig. 2).
 - **M&A advise**: as Blackwell sells a lot of accessories, the acquisition of Electronidex could create positive synergies for these type of categories
- **Large basket** → multiple product categories: when customers buy products from multiple distinct categories, it is much more likely that they buy a desktop PC or/and a laptop accompanied by different accessories (e.g. headphones, printers, mice, monitors) as if they were purchasing a complete set.
 - **M&A advise**: as “warranties” are one of the best products sold by Blackwell, the acquisition of Electronidex would likely translate into more opportunities to cross-sell them (Appendix Fig. 3)

ELECTRONIDEX BASKET ANALYSIS: Analysis by product

The **analysis** of the transactions **at product level** reveals that **Electronidex** is mostly a **B2B wholesaler**: in fact the results show that a lot of times Electronidex’s customers buy at the same time desktop PCs and Laptops, an unusual combination for a normal customer, but very common among business clients. This insight suggests that **its customer base is mainly** composed by **retailers, small and medium businesses** and **offices**. (Appendix Fig. 4)

BLACKWELL & ELECTRONIDEX: M&A insights

Blackwell is a successful **electronics retailer** with an experience of **over 40 years**, owner of **30 stores** in the Southeast of USA. A little over **a year ago** the company launched its **eCommerce website**, starting to build up customer transactions data from the site in order to leverage them and maximize the amount of revenues generated from eCommerce sales. It's a **B2C business**, serving mainly non-business customers.

Electronidex is a **start-up electronics online wholesaler**, whose **customer base** (according to our analysis) is **mostly composed by businesses** and, in a small portion, by non-business consumers (e.g. families, students as suggested by the sales of products like Office Home Edition and Smart Home devices).

The **acquisition** of a company can bring several **advantages**:

- **Strategic advantages:**
 - Acquisition of new customers
 - Acquisition of new strategic suppliers
 - Product diversification
 - Increase of market share
 - Possibility to serve new markets/industries
 - Better industry positioning
- **Economics advantages:**
 - Costs reduction due to economies of scale and/or economies of scope
 - Costs reduction related to better supply contracts
 - Increase of revenues
- **Fiscal advantages:**
 - Exemption or reduction of the amount of tax to be paid
- **Financial advantages:**
 - Access to new/higher financial resources
 - Possibility of new investments

By acquiring Electronidex, **Blackwell** could get both **strategic and economic advantages** (for the financial and fiscal benefits, further analysis from Financial & Legal department would be beneficial): first of all, the possibility to **enter in the B2B market**, starting to serve also business customers. Secondly, the chance to **add new products (typology and brand) in the product-mix** and apply **cross selling promotions**, for example with the "ViewSonic monitor" that, from the analysis, appears a lot in the Electronidex transactions. In particular, the acquisition will likely **boost sales of PCs and laptops**, as nowadays Blackwell is selling mostly accessories; another important possibility would be the **increase in the selling of "extended warranties"** that is its best seller in terms of profit. The products from the two companies are complementary, so from the analysis there are **no major risks of cannibalization**.

Moreover, important **synergies** could arise **from the union of the expertises of the two businesses**:

- Blackwell has 30 stores serving, at the moment, only non business clients → the acquisition could bring some small business clients to the shops, raising their revenues
- Electronidex is specialized in online sales, and so Blackwell could learn a lot from its best practices related the management of the online e-commerce

Finally, an important plus related to the potential acquisition of this online company, would be the **reduction of supply costs** due to the possibility to buy directly from producers, bypassing a middleman in the supply chain (i.e. wholesalers), and the increasing of revenues related to the enlargement of the customer base.

CONCLUSIONS & RECOMMENDATIONS

The Electronidex basket analysis was conducted with the objective of **identifying purchasing patterns within its consumers' transactions** in order to gain insights and **inform Blackwell's decisions about the possibility to acquire or not the company**.

Putting together all the results of this analysis, it is possible to state that **Electronidex acquisition could bring several benefits to Blackwell**, both from a **strategical and economical point of view**: the acquisition of new business customers and new strategic suppliers, the possibility to diversify the product mix in terms of type of product and brand, the reduction of costs and increase of revenues related to the synergies arising from the capabilities of the two companies, are all advantages that could be obtained from this merge. Finally, the analysis showed **interesting insights for setting up better cross selling activities and sales promotions** in order to boost online and offline sales and so profits.

APPENDIX

Fig. 1

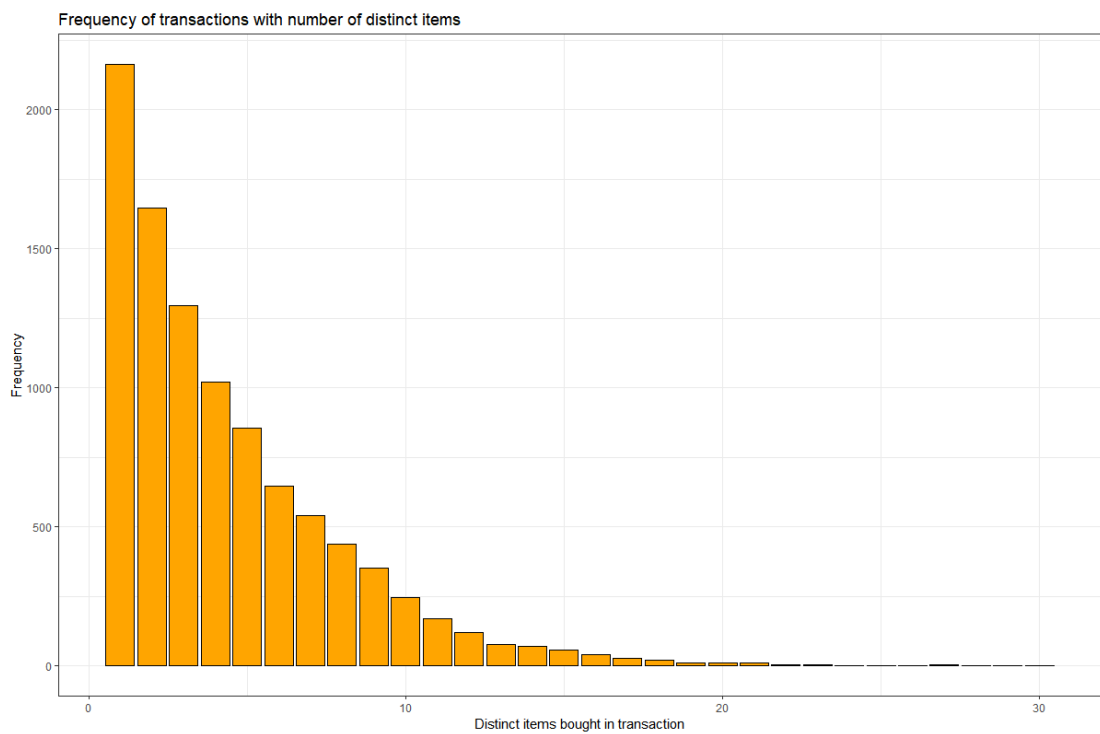


Fig. 2

```
> inspect(sort(rules1Sup, decreasing = TRUE, by = "lift")[1:20])
```

lhs	rhs	support	confidence	lift	count
[1] {Speakers}	=> {computer Headphones}	0.04900864	0.5205184	1.690095	482
[2] {Mouse and Keyboard Combo}	=> {computer Headphones}	0.04605999	0.5159453	1.675247	453
[3] {Smart Home Devices}	=> {computer Headphones}	0.08276563	0.5049628	1.639587	814
[4] {Computer Stands}	=> {Monitors}	0.03324860	0.5109375	1.585196	327
[5] {Computer Stands}	=> {Active Headphones}	0.03640061	0.5593750	1.507660	358
[6] {Keyboard}	=> {Active Headphones}	0.07676665	0.5543319	1.494068	755
[7] {Smart Home Devices}	=> {Active Headphones}	0.09059481	0.5527295	1.489749	891
[8] {Speakers}	=> {Active Headphones}	0.05195730	0.5518359	1.487341	511
[9] {Mouse and Keyboard Combo}	=> {Active Headphones}	0.04900864	0.5489749	1.479630	482
[10] {Speakers}	=> {computer Mice }	0.05592272	0.5939525	1.423026	550
[11] {Monitors}	=> {Active Headphones}	0.16573462	0.5141956	1.385890	1630
[12] {Computer Headphones}	=> {Active Headphones}	0.15831215	0.5140310	1.385447	1557
[13] {Smart Home Devices}	=> {computer Mice }	0.09130656	0.5570720	1.334666	898
[14] {Computer Tablets}	=> {computer Mice }	0.06466701	0.5525630	1.323863	636
[15] {Keyboard}	=> {computer Mice }	0.07585155	0.5477239	1.312269	746
[16] {Mouse and Keyboard Combo}	=> {computer Mice }	0.04819522	0.5398633	1.293436	474
[17] {Computer Stands}	=> {computer Mice }	0.03446873	0.5296875	1.269056	339
[18] {Printers}	=> {computer Mice }	0.12536858	0.5296392	1.268941	1233
[19] {Computer Headphones}	=> {computer Mice }	0.16176919	0.5252559	1.258439	1591
[20] {Laptops}	=> {computer Mice }	0.16370107	0.5225576	1.251974	1610

• Fig. 3

```
> inspect(sort(rules2Sup, decreasing = TRUE, by = "lift")[1:20])
```

	lhs	rhs	support	confidence	lift	count
[1]	{Active Headphones, Printers, Smart Home Devices}	=> {Computer Headphones}	0.02430097	0.6848138	2.223553	239
[2]	{Active Headphones, Desktop, Laptops, Smart Home Devices}	=> {Computer Headphones}	0.02033554	0.6825939	2.216346	200
[3]	{Accessories, Active Headphones, Desktop, Smart Home Devices}	=> {Computer Headphones}	0.02114896	0.6797386	2.207075	208
[4]	{Active Headphones, Laptops, Monitors, Printers}	=> {Computer Headphones}	0.02338587	0.6744868	2.190022	230
[5]	{Active Headphones, Computer Mice, Laptops, Smart Home Devices}	=> {Computer Headphones}	0.02206406	0.6718266	2.181385	217
[6]	{Active Headphones, Computer Mice, Desktop, Smart Home Devices}	=> {Computer Headphones}	0.02511439	0.6711957	2.179336	247
[7]	{Active Headphones, Computer Mice, Monitors, Smart Home Devices}	=> {Computer Headphones}	0.02318251	0.6705882	2.177364	228
[8]	{Accessories, Laptops, Monitors, Printers}	=> {Computer Headphones}	0.02003050	0.6700680	2.175675	197
[9]	{Computer Mice, Desktop, Laptops, Smart Home Devices}	=> {Computer Headphones}	0.02053889	0.6688742	2.171798	202
[10]	{Accessories, Printers,					

• Fig. 4

```
> inspect(sort(rules1, decreasing = TRUE, by = "lift") [1:19])
```

	lhs	rhs	support	confidence	lift
[1]	{Acer Aspire,ViewSonic Monitor}	=> {HP Laptop}	0.01077783	0.6022727	3.102856
[2]	{Dell Desktop,ViewSonic Monitor}	=> {HP Laptop}	0.01525165	0.5747126	2.960869
[3]	{CYBERPOWER Gamer Desktop,ViewSonic Monitor}	=> {HP Laptop}	0.01220132	0.5020921	2.586734
[4]	{ASUS 2 Monitor,Lenovo Desktop Computer}	=> {iMac}	0.01087951	0.5911602	2.308083
[5]	{Apple Magic Keyboard,Dell Desktop}	=> {iMac}	0.01016777	0.5847953	2.283232
[6]	{ASUS Monitor,HP Laptop}	=> {iMac}	0.01179461	0.5829146	2.275889
[7]	{ASUS 2 Monitor,HP Laptop}	=> {iMac}	0.01108287	0.5828877	2.275784
[8]	{Dell Desktop,ViewSonic Monitor}	=> {iMac}	0.01474326	0.5555556	2.169071
[9]	{Lenovo Desktop Computer,ViewSonic Monitor}	=> {iMac}	0.01576004	0.5555556	2.169071
[10]	{HP Laptop,Microsoft Office Home and Student 2016}	=> {iMac}	0.01291307	0.5521739	2.155868
[11]	{Acer Desktop,ViewSonic Monitor}	=> {iMac}	0.01006609	0.5439560	2.123782
[12]	{Acer Desktop,Lenovo Desktop Computer}	=> {iMac}	0.01230300	0.5307018	2.072033
[13]	{CYBERPOWER Gamer Desktop,ViewSonic Monitor}	=> {iMac}	0.01281139	0.5271967	2.058348
[14]	{Apple Magic Keyboard,Lenovo Desktop Computer}	=> {iMac}	0.01138790	0.5161290	2.015137
[15]	{Acer Desktop,HP Laptop}	=> {iMac}	0.01596340	0.5114007	1.996675
[16]	{Apple Magic Keyboard,HP Laptop}	=> {iMac}	0.01474326	0.5105634	1.993406
[17]	{Dell Desktop,Lenovo Desktop Computer}	=> {iMac}	0.01860702	0.5069252	1.979202
[18]	{HP Laptop,HP Monitor}	=> {iMac}	0.01057448	0.5024155	1.961594
[19]	{HP Laptop,Lenovo Desktop Computer}	=> {iMac}	0.02308083	0.5000000	1.952164


```
> inspect(sort(rules2, decreasing = TRUE, by = "lift") [1:20])
```

	lhs	rhs	support	confidence
[1]	{HP Laptop,iMac}	=> {ViewSonic Monitor}	0.02369090	0.3135935
[2]	{iMac,ViewSonic Monitor}	=> {HP Laptop}	0.02369090	0.4794239
[3]	{ViewSonic Monitor}	=> {HP Laptop}	0.04799187	0.4350230
[4]	{Dell Desktop,iMac}	=> {HP Laptop}	0.02226741	0.4078212
[5]	{Apple Magic Keyboard}	=> {Lenovo Desktop Computer}	0.02206406	0.3078014
[6]	{Apple Magic Keyboard}	=> {HP Laptop}	0.02887646	0.4028369
[7]	{HP Laptop,iMac}	=> {Lenovo Desktop Computer}	0.02308083	0.3055182
[8]	{iMac,Lenovo Desktop Computer}	=> {HP Laptop}	0.02308083	0.3927336
[9]	{HP Laptop,Lenovo Desktop Computer}	=> {iMac}	0.02308083	0.5000000
[10]	{ASUS Monitor}	=> {iMac}	0.02765633	0.4990826
[11]	{LG Monitor}	=> {HP Laptop}	0.02165735	0.3756614
[12]	{Dell Desktop,HP Laptop}	=> {iMac}	0.02226741	0.4954751
[13]	{HP Laptop,ViewSonic Monitor}	=> {iMac}	0.02369090	0.4936441
[14]	{ASUS 2 Monitor}	=> {iMac}	0.02806304	0.4867725
[15]	{ASUS Monitor}	=> {HP Laptop}	0.02023386	0.3651376
[16]	{Microsoft Office Home and Student 2016}	=> {iMac}	0.03101169	0.4663609
[17]	{Microsoft Office Home and Student 2016}	=> {HP Laptop}	0.02338587	0.3516820
[18]	{Acer Aspire}	=> {HP Laptop}	0.02907982	0.3513514
[19]	{Samsung Monitor}	=> {CYBERPOWER Gamer Desktop}	0.03101169	0.3241233
[20]	{Apple Magic Keyboard}	=> {iMac}	0.03233350	0.4510638