1. Buying Electronidex.

We have a database of all transactions made in a month of the company Electronidex. Given this we can observe the number of transactions made, the number of items per transaction, total number of products sold at least once in the list of products for sale.

Total of transactions: 9835 TR

Average of items per transaction: 4.35 items

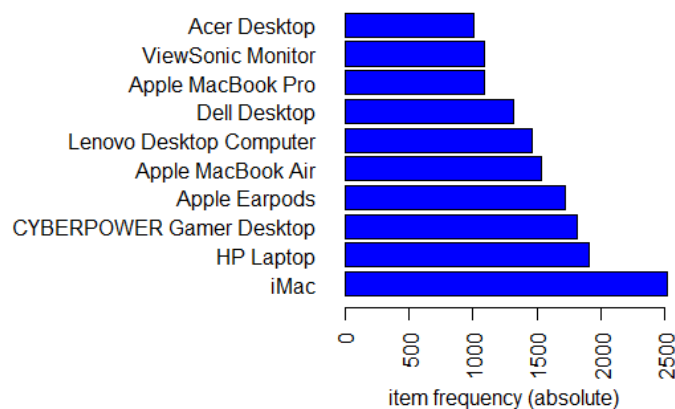**Number of items that have not been sold at least once: 0**

With these results we can see that there is a good volume of sales, the average number of items is close to 4 items. According to the distribution of items per transaction we have that the largest transactions are as follows:

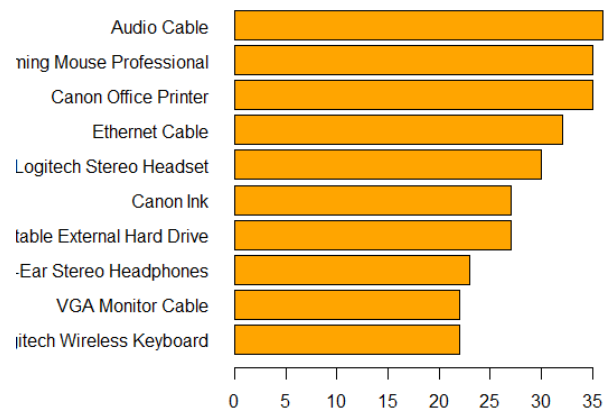**1 item: 2163 TR   2 items: 1647 TR**

3 items: 1294 TR   4 items: 1021 TR

These results show that there are good monthly purchase volumes with a variety of items per transaction.

But which items sell the most?

The ones that sell the least?

With these graphs we can see how many times a single item was sold during the month. We can notice that the top selling items are desktops, laptops and monitors while it seems that the least sold items are the big equipment accessories such as keyboards, cables, printers, headphones.

To finally determine if it is a good purchase option, we will perform a calculation of total sales for the top 10 bestselling items obtaining the Amazon price which may be a bit conservative.

Item	Cantidad	Precio Unitario	Total
iMac	2519	$ 1,799.00	$ 4,531,681.00
HP Laptop	1909	$ 749.00	$ 1,429,841.00
CYBERPOWER Gamer Desktop	1809	$ 1,729.00	$ 3,127,761.00
Apple Earpods	1715	$ 150.00	$ 257,250.00
Apple MacBook Air	1530	$ 1,200.00	$ 1,836,000.00
lenovo Desktop	1456	$ 1,249.00	$ 1,818,544.00
Dell Desktop	1318	$ 815.00	$ 1,074,170.00
Macbook Pro	1087	$ 1,300.00	$ 1,413,100.00
ViewSonic Monitor	1085	$ 279.00	$ 302,715.00
Acer Desktop	1002	$ 600.00	$ 601,200.00
		TOTAL	$ 16,392,262.00

We can see that for the 10 most purchased items which are 35% of the total items purchased approximately generate a total sales of $16,392,262 which if we are conservative and multiply it by an average of 20% in profits would be a total of $3,278,452.40 in profits only in the best sellers.

It could be concluded that good monthly profits are generated that justify the purchase of such company, however, it is a decision of the responsible departments to analyze this data to make such decision

Relationships and associations between products

As expected, there are important associations between the top 10 products mentioned above. We will look at the 2, 3 and 4 item transactions that have the highest distribution.

I) 2 items

lhs		rhs	support	confidence	coverage	lift	count
{HP Laptop}	=>	{iMac}	0.07554652	0.3892090	0.19410269	1.5195993	743
{iMac}	=>	{HP Laptop}	0.07554652	0.2949583	0.25612608	1.5195993	743
{Lenovo Desktop Computer}	=>	{iMac}	0.05876970	0.3969780	0.14804270	1.5499321	578
{iMac}	=>	{Lenovo Desktop Computer}	0.05876970	0.2294561	0.25612608	1.5499321	578
{CYBERPOWER Gamer Desktop}	=>	{iMac}	0.05673615	0.3084577	0.18393493	1.2043198	558
{iMac}	=>	{CYBERPOWER Gamer Desktop}	0.05673615	0.2215165	0.25612608	1.2043198	558
{Dell Desktop}	=>	{iMac}	0.05460092	0.4074355	0.13401118	1.5907615	537
{iMac}	=>	{Dell Desktop}	0.05460092	0.2131798	0.25612608	1.5907615	537
{ViewSonic Monitor}	=>	{iMac}	0.04941535	0.4479263	0.11032028	1.7488507	486
{iMac}	=>	{ViewSonic Monitor}	0.04941535	0.1929337	0.25612608	1.7488507	486
{ViewSonic Monitor}	=>	{HP Laptop}	0.04799187	0.4350230	0.11032028	2.2412004	472
{HP Laptop}	=>	{ViewSonic Monitor}	0.04799187	0.2472499	0.19410269	2.2412004	472
{Lenovo Desktop Computer}	=>	{HP Laptop}	0.04616167	0.3118132	0.14804270	1.6064341	454

We can conclude that in this case the reliability is somewhat low because there is no reliable pattern due to the number of transactions. We see that likewise iMac and HP Laptop are the star products.

It is important to note that for a reliability higher than 50 and a support higher than 0.1 there are no transactions with only 2 items.

II) 3 items

lhs		rhs	support	confidence	coverage	lift	count
{HP Laptop,Lenovo Desktop Computer}	=>	{iMac}	0.02308083	0.5000000	0.04616167	1.952164	227
{Dell Desktop,Lenovo Desktop Computer}	=>	{iMac}	0.01860702	0.5069252	0.03670564	1.979202	183
{Acer Desktop,HP Laptop}	=>	{iMac}	0.01596340	0.5114007	0.03121505	1.996675	157
{Lenovo Desktop Computer,ViewSonic Monitor}	=>	{iMac}	0.01576004	0.5555556	0.02836807	2.169071	155
{Dell Desktop,ViewSonic Monitor}	=>	{HP Laptop}	0.01525165	0.5747126	0.02653787	2.960869	150
{Apple Magic Keyboard,HP Laptop}	=>	{iMac}	0.01474326	0.5105634	0.02887646	1.993406	145

In this case it can be noticed that for the purchase 2 items there is a 50% higher confidence that customers will also buy an iMac except if they buy a Dell Desktop which they would buy an HP laptop. Note that they are ordered from highest to lowest with respect to the

number of transactions since we want to find the ones with the highest sales in this case, i.e. the support of this transaction.

III)   4 items

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lhs                                                         rhs            support     confidence coverage    lift     count
{Dell Desktop,HP Laptop,Lenovo Desktop Computer}           => {iMac}      0.008845958 0.5878378  0.015048297 2.295111 87
{Dell Desktop,HP Laptop,ViewSonic Monitor}                 => {iMac}      0.008744281 0.5733333  0.015251652 2.238481 86
{Dell Desktop,iMac,ViewSonic Monitor}                      => {HP Laptop} 0.008744281 0.5931034  0.014743264 3.055617 86
{HP Laptop,Lenovo Desktop Computer,ViewSonic Monitor}      => {iMac}      0.008439248 0.6014493  0.014031520 2.348255 83
{iMac,Lenovo Desktop Computer,ViewSonic Monitor}           => {HP Laptop} 0.008439248 0.5354839  0.015760041 2.758766 83
{Dell Desktop,Lenovo Desktop Computer,ViewSonic Monitor}   => {iMac}      0.006914082 0.6938776  0.009964413 2.709125 68
{Acer Desktop,Dell Desktop,HP Laptop}                      => {iMac}      0.006812405 0.5491803  0.012404677 2.144180 67
{Acer Desktop,Dell Desktop,iMac}                           => {HP Laptop} 0.006812405 0.5726496  0.011896289 2.950240 67
{Acer Aspire,Dell Desktop,HP Laptop}                       => {iMac}      0.006405694 0.5779817  0.011082867 2.256629 63
{Acer Aspire,Dell Desktop,iMac}                            => {HP Laptop} 0.006405694 0.5779817  0.011082867 2.977711 63
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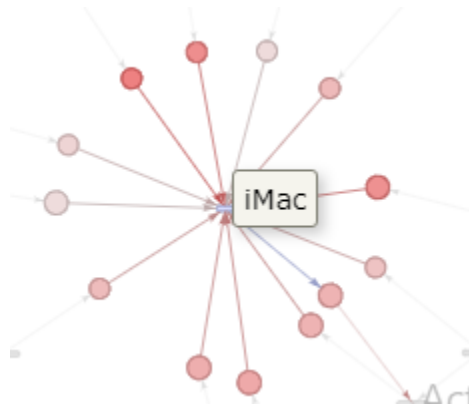
Finally, we can see that iMac and HP Laptop are the star products and the combination of these products finally tend to buy one of the two items.

Conclusions

- The confidence of the rules with 2 items is less than 50% but they are the largest transactions.

- The rules with 3 items have the highest confidence level +50% with a good support value of more than 100 transactions. It could be a good opportunity to increase sales and optimize profits since at the same time the combination of these products is in the top 10 of sales.

- Lower number of transactions for the 4 items but the confidence is a little higher than the others. Good opportunity to place them in shopping suggestions or when searching for a product that the others appear.

- It should be noted that there are products with very high confidence, but with low support, it would be good to perform an analysis of profits and costs for the combination of products to find any potential advantage between these associations. It is worth noting that these high confidence products are not among the top selling products.

- Finally, the flagship products are iMac and the HP Laptop.

All products associated with iMac