DATA
REPORT
17.01.20

BLACKWELL'S INITIAL DATA REPORT

CJF

our main goal is to support your company to live long and prosper

EXPERIENCE FROM THE PAST, ADVANCE INTO THE FUTURE.

With over 40 years of experience, Blackwell has established itself as a powerful name on the market. However, brand loyalty and long term background are not a guarantee of future success. We, from the CJF Data Analysis Group, are looking forward to helping you finding the best solutions towards prosperity.

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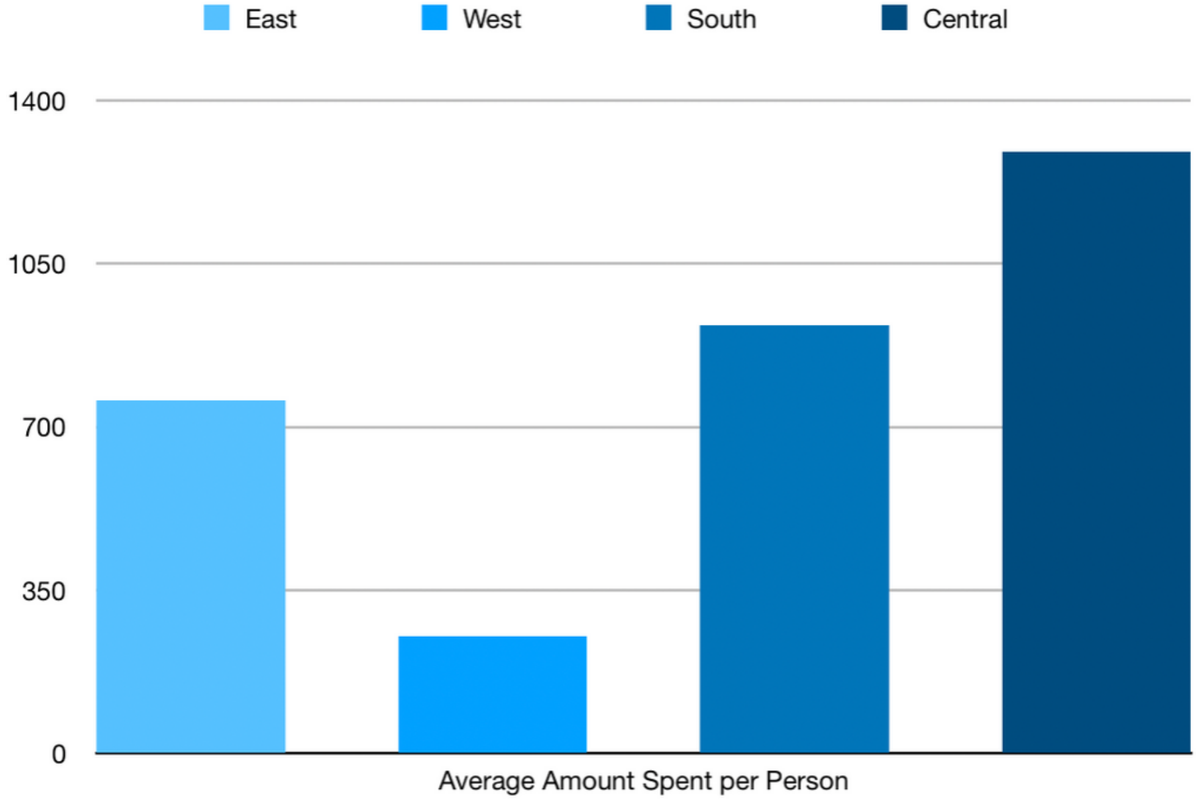
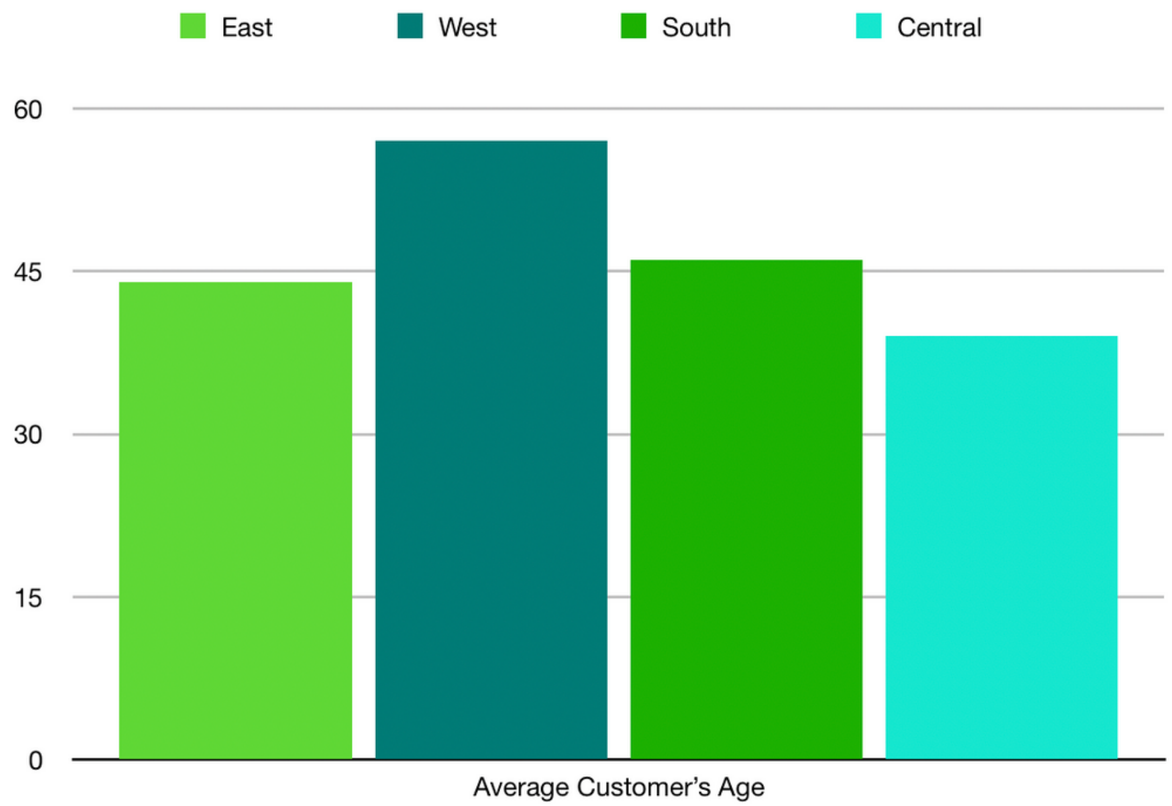
REGIONS: BASIC PRIMARY ANALYSIS

- **THESE VISUALISATIONS ALLOW US TO HAVE A POWERFUL GLIMPSE TOWARDS THE ANALYSED REGIONS. THEY SHOW US THE AVERAGE AMOUNT SPENT AND THE CUSTOMER'S AVERAGE AGE FOR EACH REGION:**





Which region spends more?

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Do younger people buy more online?

Actually there seems to be no linear correlation between age and the place of purchase

Attribu...	in.store	age	items	amount	region
in.store	1	-0.176	-0.013	-0.063	?
age	-0.176	1	0.006	-0.283	?
items	-0.013	0.006	1	-0.002	?
amount	-0.063	-0.283	-0.002	1	?
region	?	?	?	?	1

The Correlation Matrix presents us only small vectors, showing there is no linear correlation between any of the numerical features.

HAVING STATED THAT, IT MEANS WE NEED FURTHER ANALYSIS TO EXTRACT MORE INFORMATION AND PREDICT MORE ACCURATELY THE RELATIONSHIP BETWEEN THE COLUMS.

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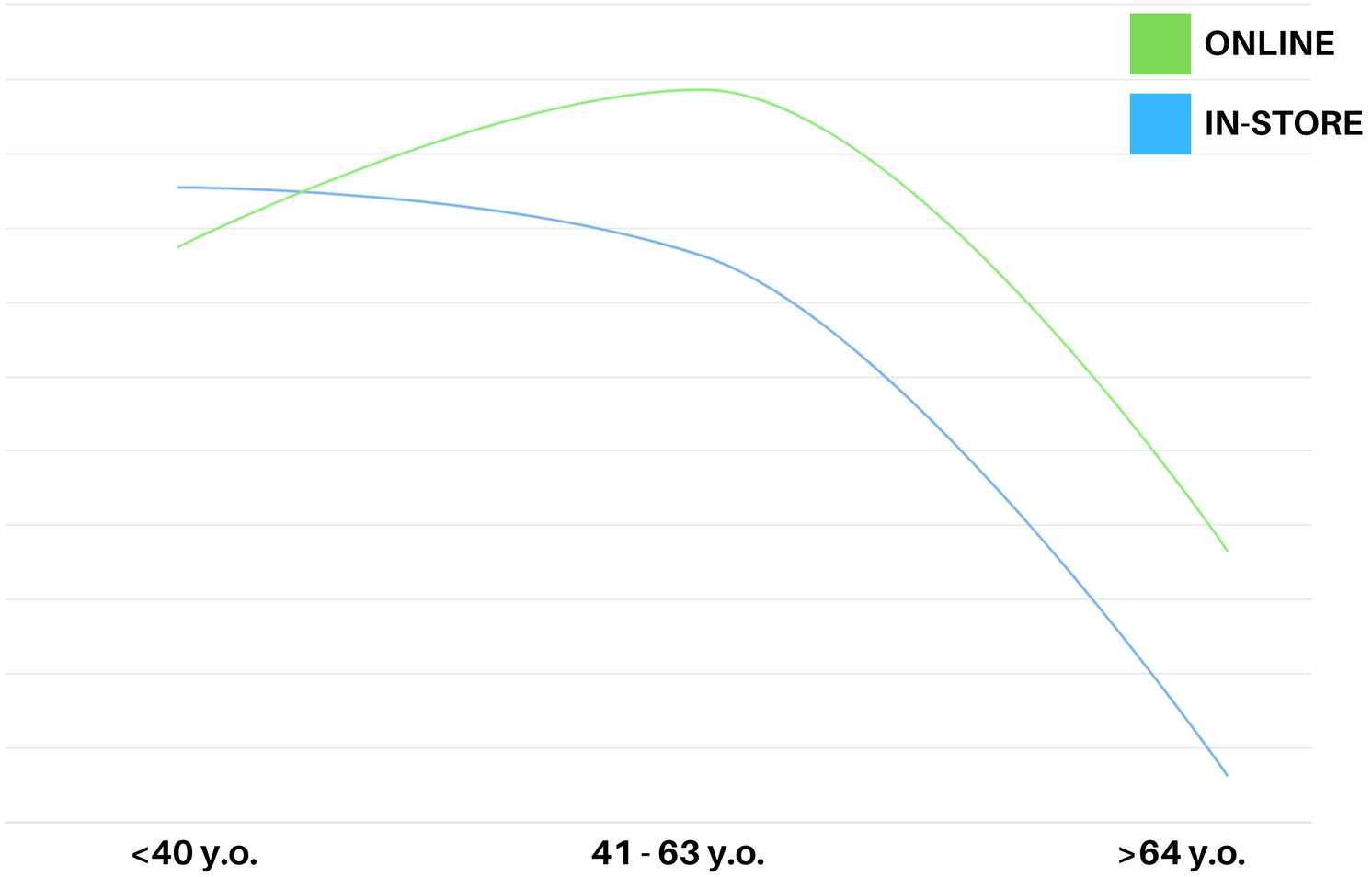
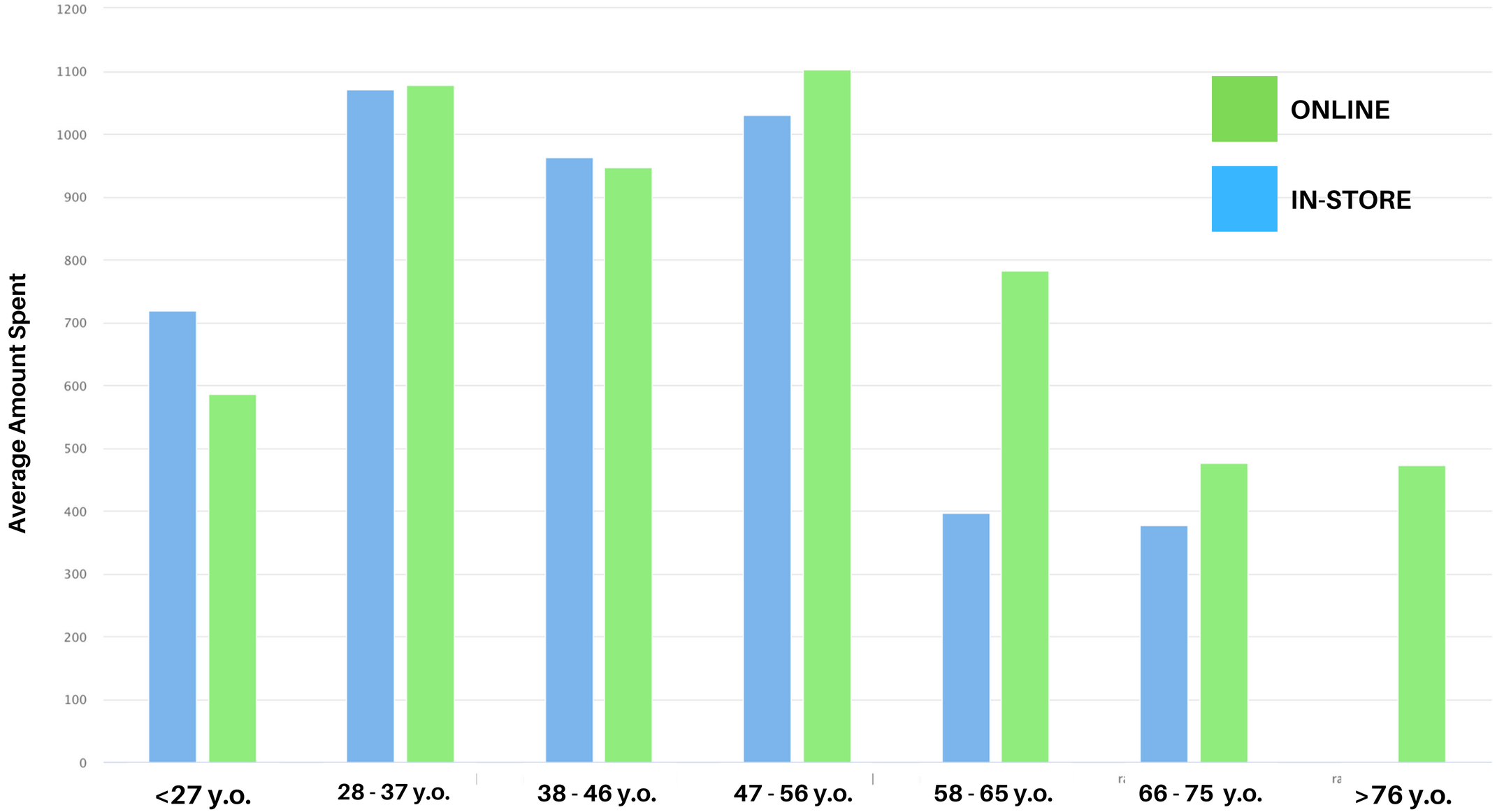
Age and Online Purchase: A Non-Linear Correlation



ALTHOUGH THERE IS NO LINEAR CORRELATION, THERE SEEMS TO BE ANY KIND OF RELATIONSHIP BETWEEN THESE TWO FEATURES, ALMOST FORMING A PARABOLE.

This graph takes into account only the number of transactions, independent to the amount spent. We can infer that younger and older ages tends to make less online transactions, while middle ages are the vertex.



This interesting visualisation allows us to observe the average amount spent per age rank, also comparing the online and in-store transactions. This graph represents the total amount spent by each age range, not necessarily the number of transactions made by each group.

INSIGHTS FROM THE VISUALISATION ABOVE

IN OVERALL, THERE SEEMS TO APPEAR SOME EQUALITY BETWEEN ONLINE/IN-STORE.

MILLENIALS ARE ACTUALLY BUYING MORE IN-STORE

ON THE AGE RANGE 58-65 THERE IS A GREATER DIFFERENCE BETWEEN PURCHASE LOCATION.

OLDER PEOPLE SEEMS TO BE BUYING MORE ONLINE THAN MILLENIALS.

INTERESTING FACT: THERE IS NOT ONE SINGLE PURCHASE IN-STORE FOR AGES ABOVE 76

THERE IS A SIGNIFICANT ONLINE PURCHASE AMOUNT FOR. AGES 76 AND ABOVE.

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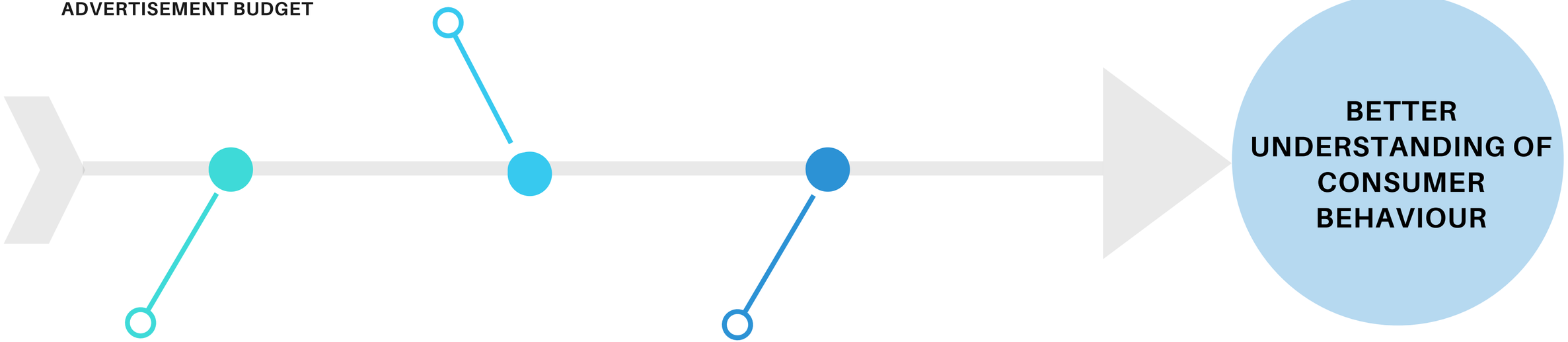
DECISION TREE: A DEEPER ANALYSIS

WHY ARE DECISION TREES USED AND WHAT ARE THEIR PURPOSE?

"THE POSSIBLE SOLUTIONS TO A GIVEN PROBLEM EMERGE AS THE LEAVES OF A TREE, EACH NODE REPRESENTING A POINT OF DELIBERATION AND DECISION."
NIKLAUS WIRTH (1934 —), PROGRAMMING LANGUAGE DESIGNER

DETERMINATION OF LIKELY BUYERS OF A PRODUCT USING DEMOGRAPHIC DATA TO ENABLE TARGETING OF LIMITED ADVERTISEMENT BUDGET



EVALUATION OF BRAND EXPANSION OPPORTUNITIES FOR A BUSINESS USING HISTORICAL SALES DATA

DECISION TREES ARE COMMONLY USED IN OPERATIONS RESEARCH, SPECIFICALLY IN DECISION ANALYSIS, TO HELP IDENTIFY A STRATEGY MOST LIKELY TO REACH A GOAL.

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Decision Trees' Analysis

East

- Majority in-store sales and under $750;
- Purchases over $1000 are made by young buyers (<40).

West

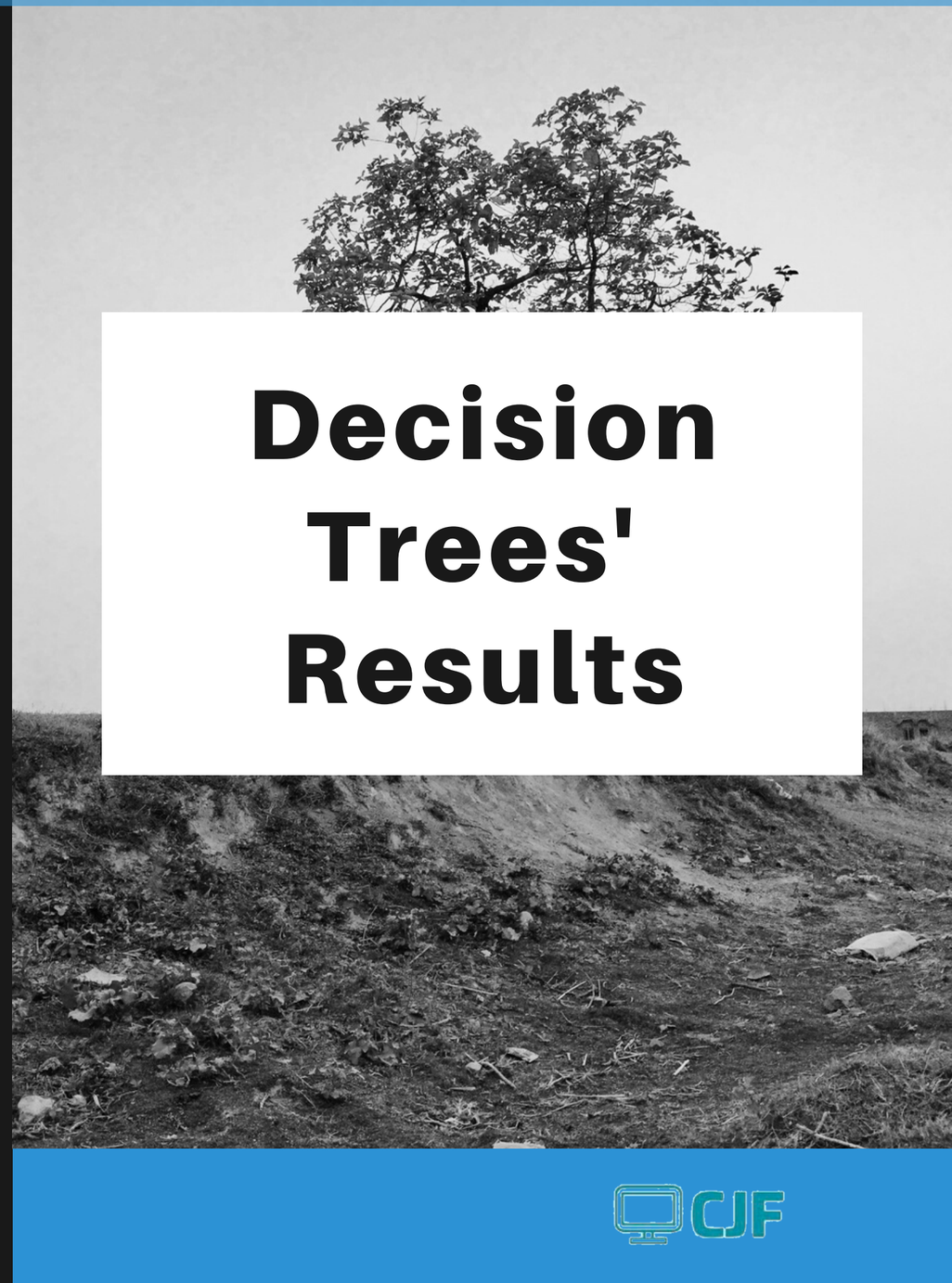
- Predominantly above 60 years old consumers;
- Almost online exclusively;
- Purchases below $750.

South

- More in-store transactions;
- Purchases above $1000 are made online.

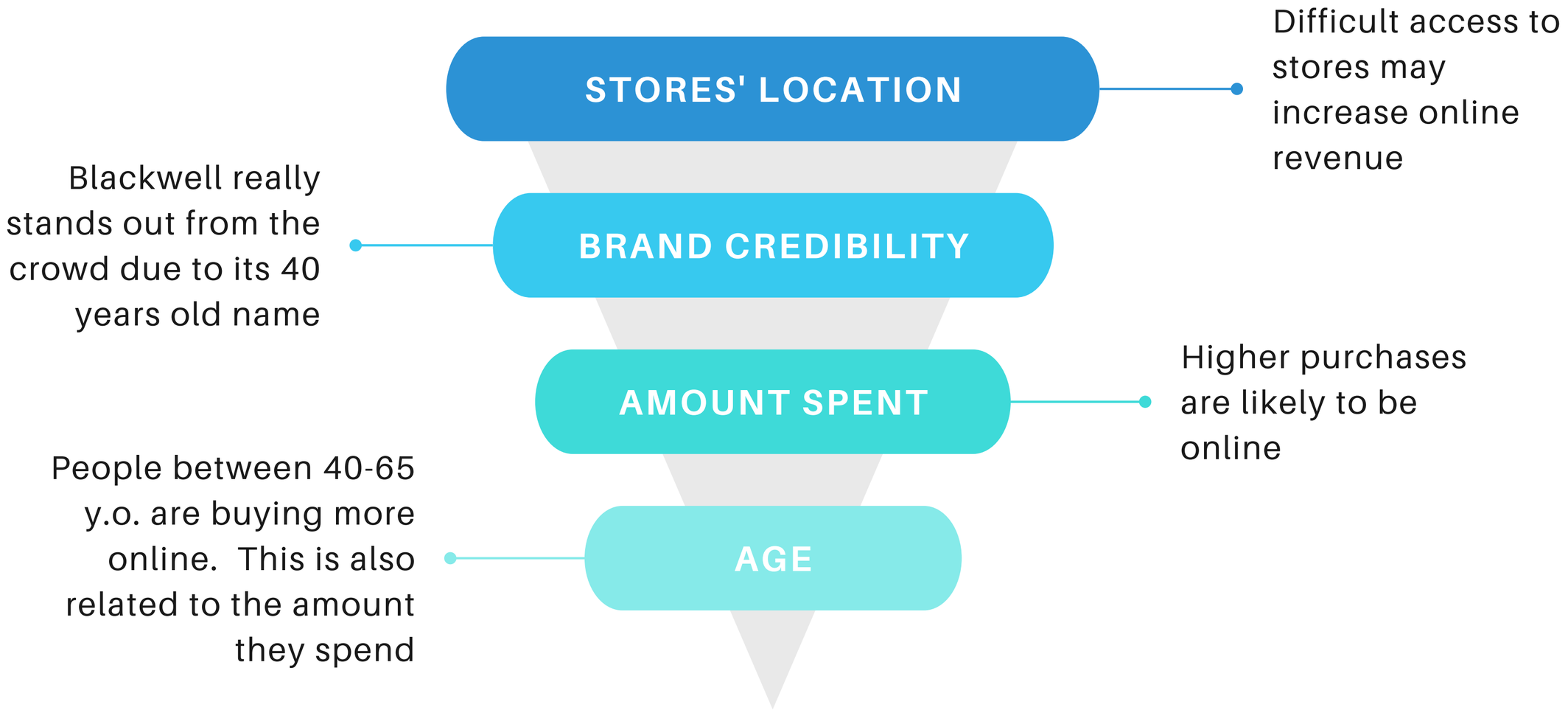
Central

- Purchases over $2000 are made online and by people over 40 years old;
- Majority in-store transactions under $500.



Decision Trees' Results

FACTORS CONTRIBUTING TO ONLINE SHOPPING



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Which factors are contributing to online shopping?

1. Stores' Location

The West region, which has, in average, older buyers, has no stores around. This is crucial for elder people to buy more, or exclusively, online.

2. Brand Credibility

Blackwell has already consolidated its brand on the retail segment, what eases its path on the online market. Even older people who are less comfortable buying online may give it a try due to the company's well known name.

3. Amount Spent

More expensive transactions tend to be made online. Buyers are more likely to search and compare prices for higher value purchases, while In-stores purchases tend to be more casual and impulsive.

Other factors:

- Clients' age.
- Convenience: Saving time.
- Practical Return Policy
- Efficient chanel between store and clients

Number of itens x Amount Spent: Analysing Clusters

The Correlation Matrix shows us no linear correlation. The Decision Tree do not point "number of itens" as the root of any tree, indicating there is no potential link between them. Finally we analised k-means clusters to try to find any relationship between therse two factors.

So, the relationship between the number of itens and the amount spent cannot be considered significant .

Attribute	cluster_0	cluster_1	cluster_2	cluster_3
age	43.112	41.008	50.866	38.203
items	4.560	4.527	4.492	4.448
amount	852.647	2546.437	281.909	1633.581

Clustering finds groups of data which are somehow equal. Here we see clusters differentiating by amount. And while there is a slight yet considerable age variation there is no evidence showing us that the number of itens varies. In other words, the number of itens has no impact on the amount spent.

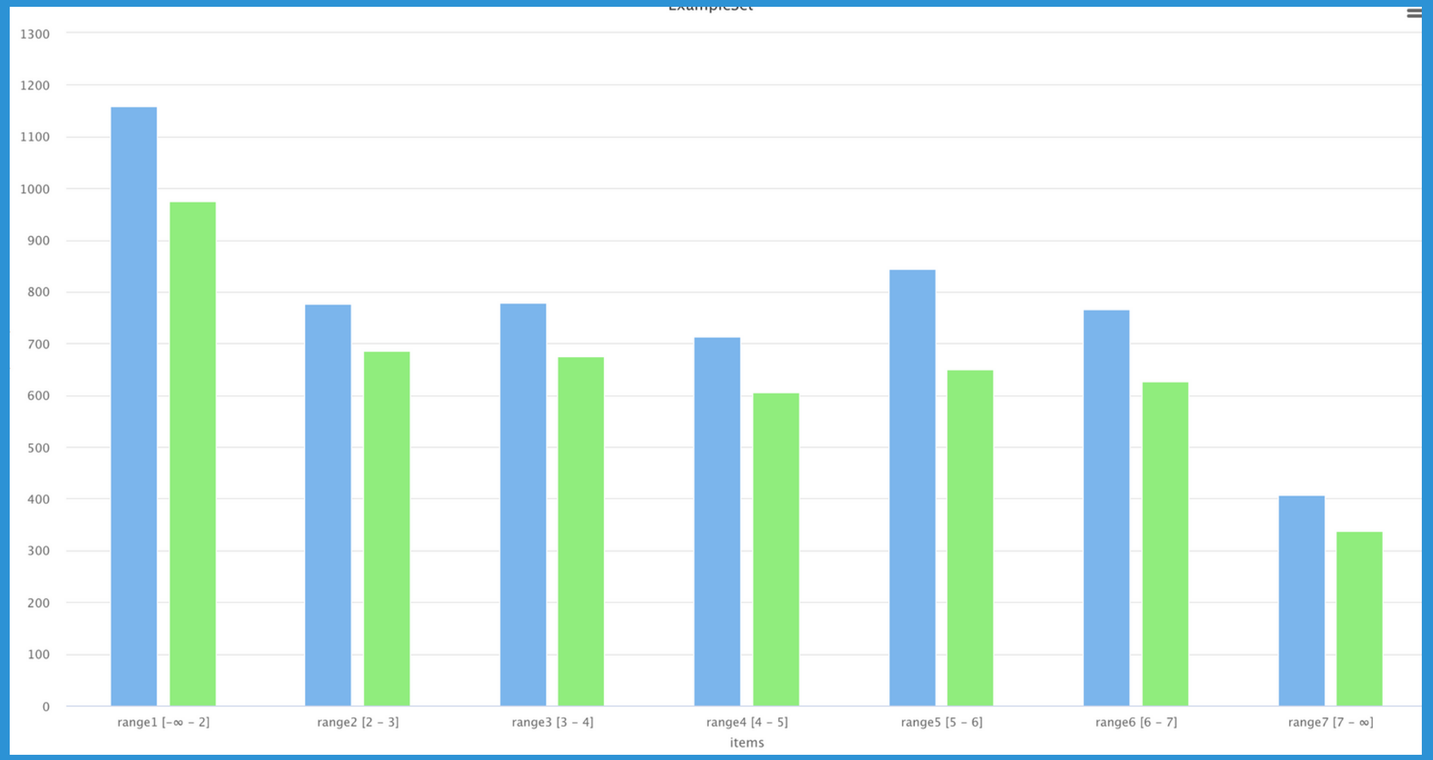
It is also possible to filter the clusters to have a deeper look into its information. So we can clearly see how the number of itens vary without correlation between the clusters.

Row No.	id	cluster	age	items	amount
1	3	cluster_2	51	7	143.590
2	6	cluster_2	79	6	426.170
3	7	cluster_2	79	1	471.430
4	8	cluster_2	31	3	115.520
5	9	cluster_2	29	6	129.250
6	12	cluster_2	55	6	352.820
7	13	cluster_2	58	1	450.410
8	14	cluster_2	73	5	416.930
9	22	cluster_2	56	5	15.860
10	23	cluster_2	50	8	152.970
11	24	cluster_2	71	6	74.100
12	25	cluster_2	59	1	344.110
13	27	cluster_2	62	5	381.250
14	28	cluster_2	37	1	361.420
15	30	cluster_2	47	4	480.060
16	32	cluster_2	20	8	114.600
17	33	cluster_2	37	7	234.270
18	38	cluster_2	28	4	97.310
19	40	cluster_2	30	7	514.600
20	42	cluster_2	31	6	377.830

Row No.	id	cluster	age	items	amount
1	2	cluster_0	58	4	968.380
2	4	cluster_0	40	7	863.820
3	5	cluster_0	41	4	915.210
4	10	cluster_0	25	6	1025.900
5	15	cluster_0	60	3	638.380
6	18	cluster_0	50	4	749.370
7	20	cluster_0	48	8	707.090
8	21	cluster_0	35	1	965.750
9	26	cluster_0	72	1	919.240
10	29	cluster_0	25	2	569.470
11	31	cluster_0	74	7	896.370
12	34	cluster_0	38	2	734.630
13	35	cluster_0	51	2	1213.500
14	36	cluster_0	42	2	937.620
15	41	cluster_0	53	8	1085
16	43	cluster_0	33	7	890.630
17	45	cluster_0	34	3	1040.800

Examples of clusters 0 and 3, allowing us to explore more carefully

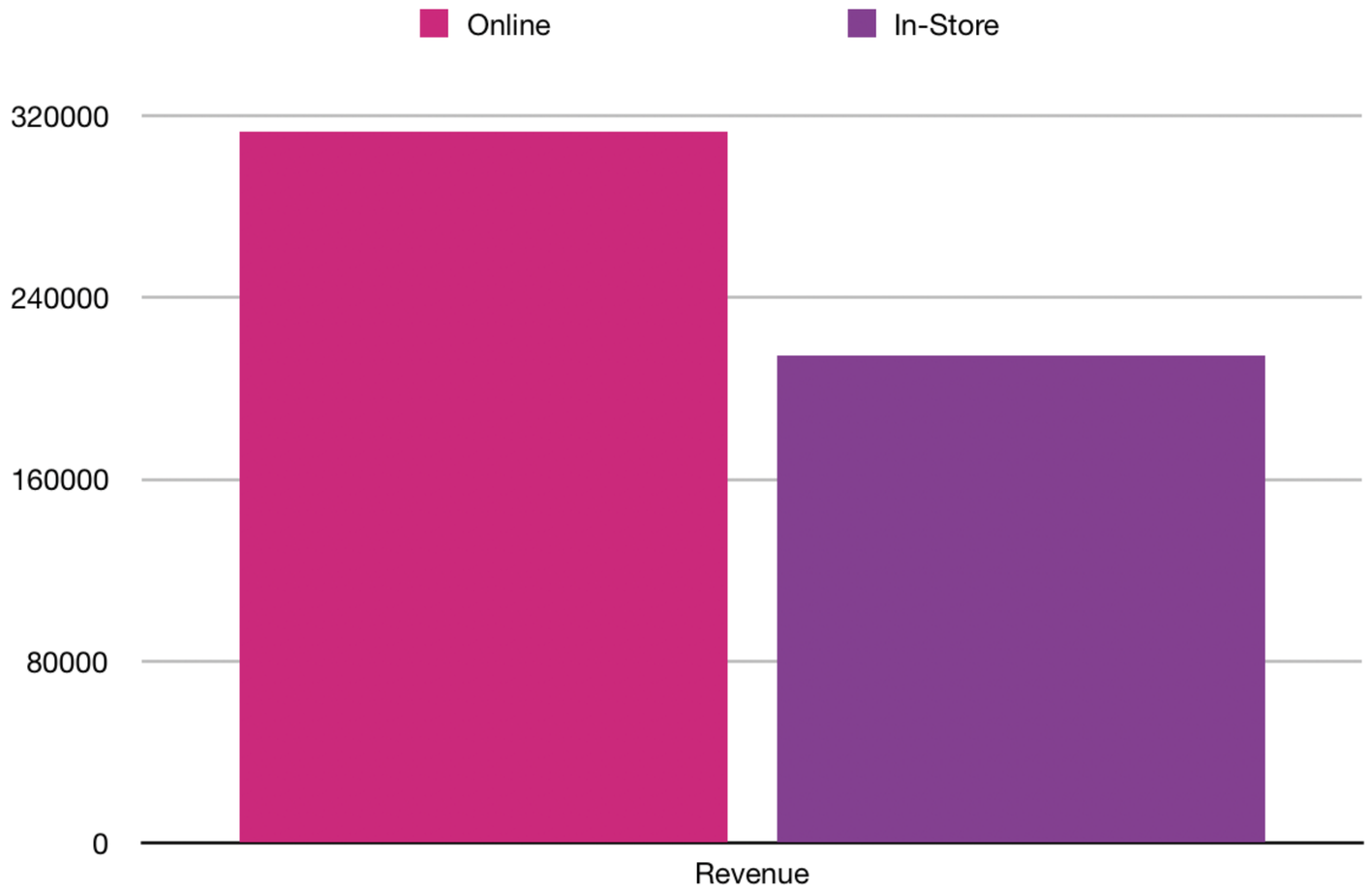
TURN SINGLE-ITEM PURCHASES INTO MORE-ITENS ONES.



Although there is no relevant connection between number of itens and amount spent, there seems to exist an important aspect concerning the number of itens: there are many one-item purchases. Of course this is a normal tendency, once there are customers looking for only one specific product. There are, however, powerful methods for triggering buyers to adding more itens into their baskets.

This visualisation presents us with the number of itens and the local of transaction. We can clearly see that there is a considerable number of online transactions (in blue) that contains only one item. These single product buyers could potentially purchase more itens. Use mechanisms to suggest them more itens when they add a product to the shopping basket or when they are about to do the checkout, specially itens on sale. According to our prior studies this strategy can increase 2+ products purchases in 10-15%.

ONLINE VS. IN-STORE REVENUE



ONLINE PURCHASES REPRESENT ALMOST 60% OF BLACKWELL'S MENSAL REVENUE, AND THERE'S STILL ROOM FOR IMPROVEMENT.

PEOPLE ARE NOT NECESSARILY BUYING MORE ONLINE. BUT THEY ARE CERTAINLY PURCHASING MORE VALUABLE ITENS VIA INTERNET.

BLACKWELL IS CLEARLY DOING A GOOD JOB ONLINE BUT WITH DATA IT CAN ALWAYS GET BETTER.

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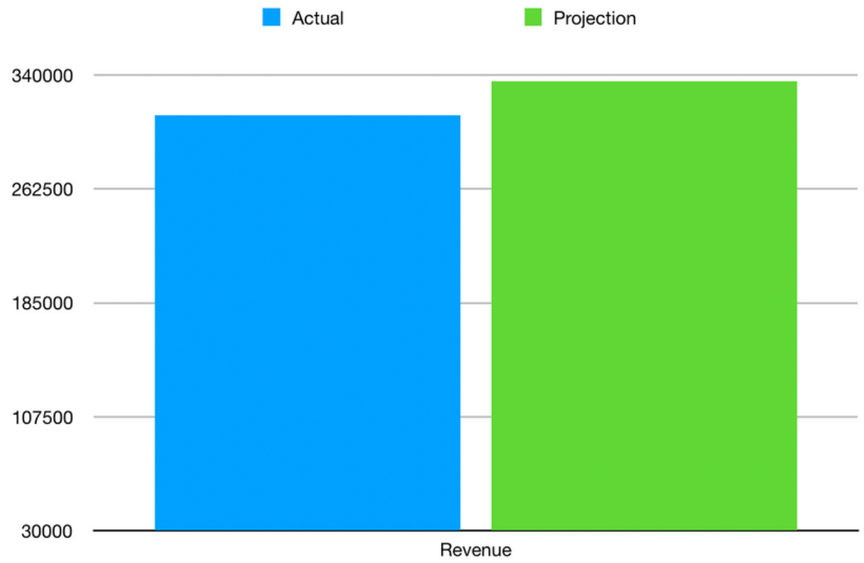
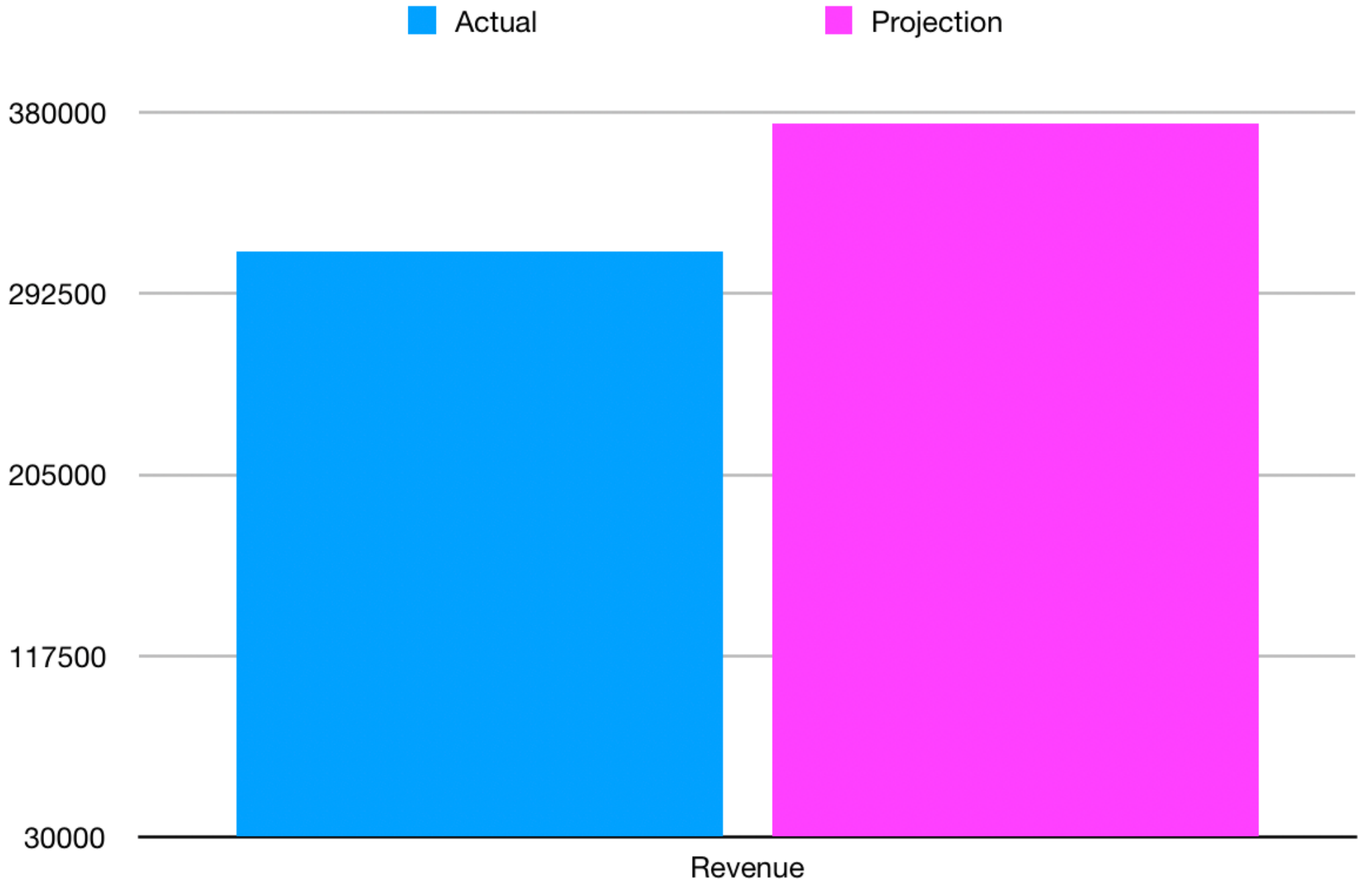
ONLINE SALES PROJECTION



STATISTICS FORESEE A 7.3% GROWTH FOR ELECTRONIC'S ONLINE SALES IN 2020. SO THIS WOULD BE BLACKWELL'S MINIMUN GROWTH.

SOURCE: HTTPS://WWW.STATISTA.COM



BASED IN OUR PRIOR CASES, SEGMENTED MARKETING STRATEGY COULD ENHANCE BLACKWELL'S ONLINE SALES IN 20%. THIS IS OUR GOAL.

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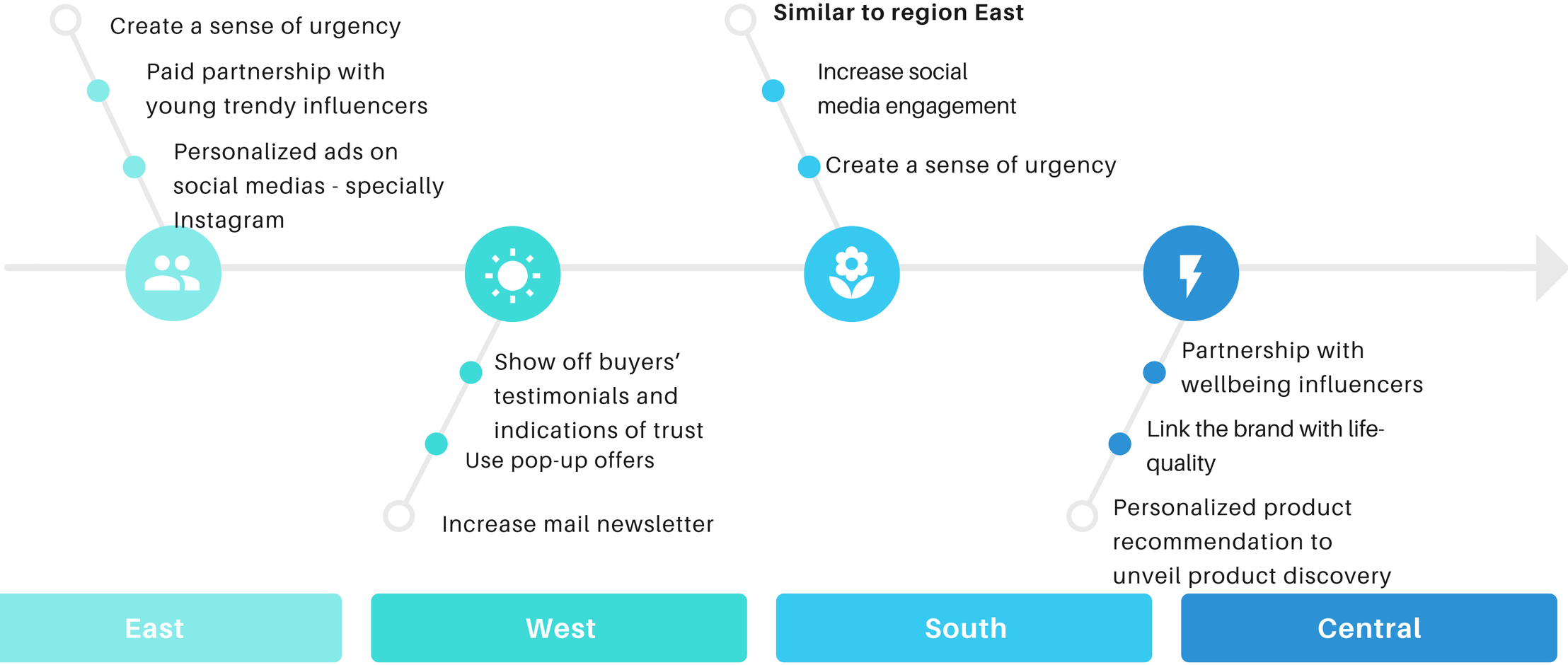
Reaching the Goal Successfully

DIFFERENT REGIONS. DIFFERENT APPROACHES.



Different regions. Different approaches.

SOUTH AND EAST

Younger buyers.

- More influenced by advertisement, specially those appealing and that creates a sense of urgency.
- Frequent users of social medias, specifically Instagram
- Really likely to be influenced by bloggers

WEST

Older buyers

- Need more indicators of reliability and easier checkout experience.
- Allow pop-ups
- In general don't unsubscribe from mailing lists and click on the links.

CENTRAL

Mid-aged making the higher purchases.

- Interested on wellbeing and productivity
- Follow interesting content producers on social medias
- Would buy more products that could enhance their life quality

This is just the beginning.

This presentation shows an overview of Blackwell's analysis and it suggests some marketing strategies that would potentially enhance revenues. For reaching satisfactory our goal we certainly require more data for more advanced and precise analysis.

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