

A Data Scientist's Journey in a Real-World Environment

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SWISSQUOTE

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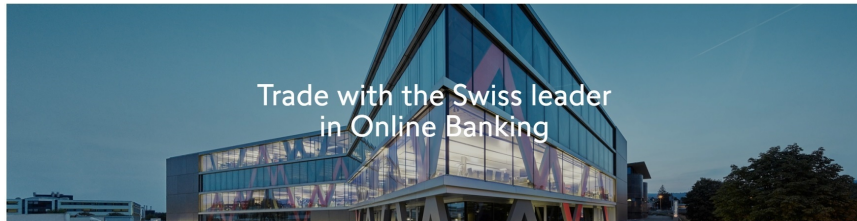
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1. Swissquote and its Business at a Glance
2. A Data Scientist's Workflow
3. Use-case: Trading Cost Simulator
4. Q&A

SQ and its business at a glance

SWISSQUOTE AND ITS BUSINESS AT A GLANCE

- ▶ Online Broker, largest in Switzerland
- ▶ Has a banking license but differs from typical banks
- ▶ Main mission: "democratize finance", by making financial services easily accessible to private investors



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Trading

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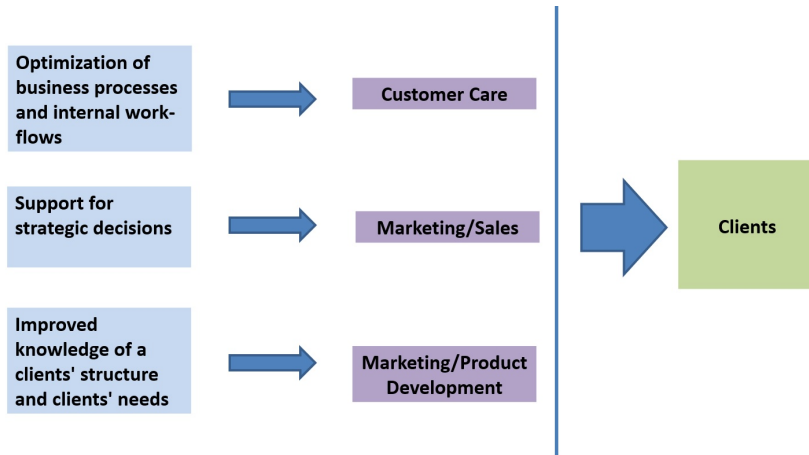
DATA SCOPE

- ▶ Market data (quotes, stock prices etc.)
- ▶ **Client accounts' data**
- ▶ **Transactional data**

THE RIGHT USE OF DATA ADDS VALUE TO A BUSINESS

- ▶ Optimization of business processes and internal work-flows (e.g., clients' on-boarding)
- ▶ Support for strategic decisions (e.g. changes in the pricing conditions)
- ▶ Improved knowledge of a clients' structure and clients' needs (e.g. personalized content of digital accounts, new investment products and services)

WHO BENEFITS FROM DATA ANALYSIS?



Data Scientist' Workflow

DATA SCIENTIST'S WORKFLOW: STEP 1

Formalizing a question/a problem to solve (interaction with the project's owner) :

- ▶ What a project's owner ultimately wants to achieve?
- ▶ What are the constraints?

DATA SCIENTIST'S WORKFLOW: STEP 2

Understanding the business context (interaction with Business Analysts)

- ▶ Identifying relevant business processes
- ▶ Setting assumptions (behavioral patterns, market conditions etc.)

DATA SCIENTIST'S WORKFLOW: STEP 3

Building the dataset (interaction with a Data Architecture team)

- ▶ Which kind of information will be useful for the analysis?
- ▶ How the data resulting from business processes are mapped into the company's databases?

DATA SCIENTIST'S WORKFLOW: STEP 4

Selecting and validating a method

- ▶ understand the nature of the problem: classification? predictions? optimization?
- ▶ understand the main statistical properties of the data
- ▶ try several alternative methods/explore different scenarios
- ▶ privilege simplicity over complexity

DATA SCIENTIST'S WORKFLOW: STEP 5

Implementing the retained method

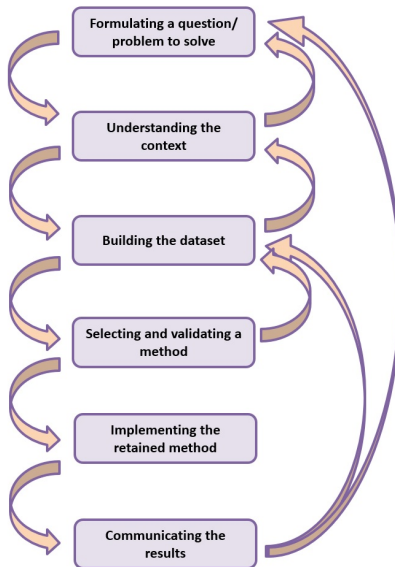
- ▶ parametrization (bottom line: anticipate potential questions and needs of a project owner -'what if...')
- ▶ generalization (i.e., can your codes be reused to address similar problems?)
- ▶ computational efficiency (e.g. alternatives to loops, parallelized computations)
- ▶ replicability of the results

DATA SCIENTIST'S WORKFLOW: STEP 6

Communicating the results

- ▶ privilege visual representation
- ▶ provide intuition behind each result/method (people do not like 'black boxes'!)

DATA SCIENTIST'S WORKFLOW: SUMMARY



Use Case

USE CASE: TRADING COST SIMULATOR

- ▶ **Context:** Marketing Department wanted to modify pricing condition for retail clients involved in eTrading (stocks, bonds, structured products)
- ▶ **Objective:** simplify pricing conditions while staying **competitive**
- ▶ **Challenge:** a benchmark to measure 'competitiveness'?

DEMO: Trading Cost Simulator

Thank you!

TRADING COST SIMULATOR 1

Cost Simulator

Client Profile

SQ new pricing

Ranking results

Overview

Get ranking

Client's trading profile

Select trading profile of a client:

Profile:

☐ Passive trader

☐ Occasional trader

☒ Frequent trader

☐ Day (heavy) trader

☐ Individual profile

Info:

1. Trading profiles of Passive/Occasional/frequent traders are specified according to the [Moneyland's trading profiles](#)

2. Individual profile should be specified manually

Portfolio structure/trading settings:

	Value {CHF/EUR/USD}:	Number of trades:	Value per trade {CHF/EUR/USD}:
Swiss equities	30000	40	7500
European equities	12500	20	6250
US equities	17000	20	8500
ETFs (Swiss)	15000	8	7500
Total (allowing for currency conversion):	75750	88	30375

TRADING COST SIMULATOR 2

Cost Simulator

Client Profile

SQ new pricing

Ranking results

Overview

Get ranking

Ranking

Info:

1. 'Saving potential' is a gain that can be realized when trading with competitors rather than under the Old/New SQ trading plan.

2. The US/EU commission curves of ZKB Onlinebank on Moneyland are misspecified.

Rating according to yearly trading costs:

	Provider	Trading Costs	Old saving potential	New saving potential
1	Saxo Bank	300.76	428.82 (58.83%)	347.32 (53.59%)
2	Corner Trader	486.75	243.83 (33.37%)	161.33 (24.89%)
3	Cash	585.05	134.89 (18.47%)	52.43 (8.06%)
4	TradeDirect	610.8	119.78 (16.4%)	37.28 (5.75%)
5	Strateo	634.05	96.53 (13.21%)	14.03 (2.16%)
6	Swissquote_new	648.08	82.5 (11.29%)	--
7	PostFinance	684	46.58 (6.38%)	--
8	Migros Bank	728.9	1.88 (0.23%)	--
9	Swissquote_old	730.58	--	--
10	Money-mat	806.17	--	--
11	UBS	910.31	--	--
12	Baier Kantonalbank	944.25	--	--
13	VZ Depository Bank	1023.01	--	--
14	ZKB Onlinebank	1048.89	--	--

Breakdown of yearly costs:

	Fees under Swissquote_new	Amount, CHF
1	Transaction Fees, Swiss Equity	0
2	Transaction Fees, EU Equity	509.03
3	Transaction Fees, US Equity	0
4	Transaction Fees, ETF	0
5	Total transaction fees	509.03
6	Transaction package fees	81.7
7	Custody fees	84.8
8	Account fees	0
9	Stamp duties	74.25
10	Total costs:	648.08

TRADING COST SIMULATOR 3

Cost Simulator

Client Profile

SQ new pricing

Ranking results

Overview

Get ranking

Overview

Reference year for the historical allocation of active clients:
2018

Type of distance to compute the historical allocation of active clients:
Euclidean distance

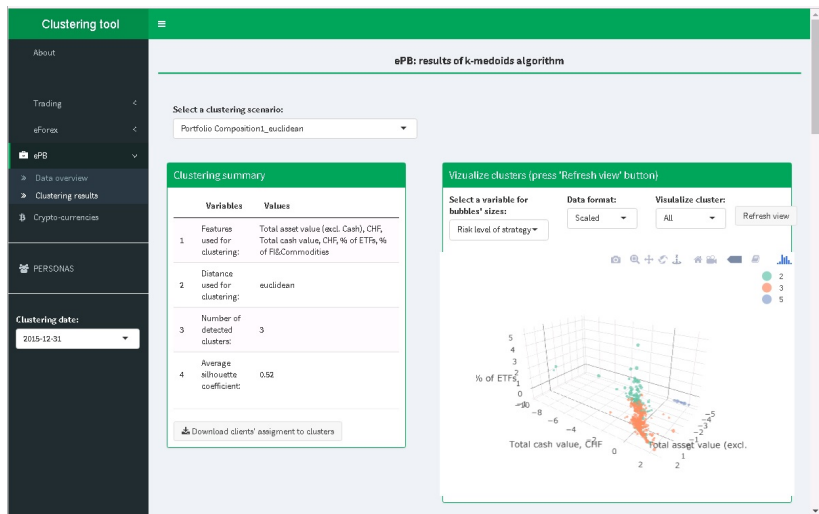
Historical allocation of ACTIVE clients:

- Historical allocation of ACTIVE clients along the Occasional/Frequent/Day profiles is obtained based on the annual number of transactions and the average volume per transaction computed for each of 4 asset classes in the selected reference year. Data are normalized in order to give all variables equal weights.
- A client is assigned to one of 3 trading profiles based on the minimum distance (Euclidean/Manhattan/Maximum) to the activity parameters of a given profile.
- To recompute the historical allocation of active client when changing the reference year/distance, press 'Get ranking'.

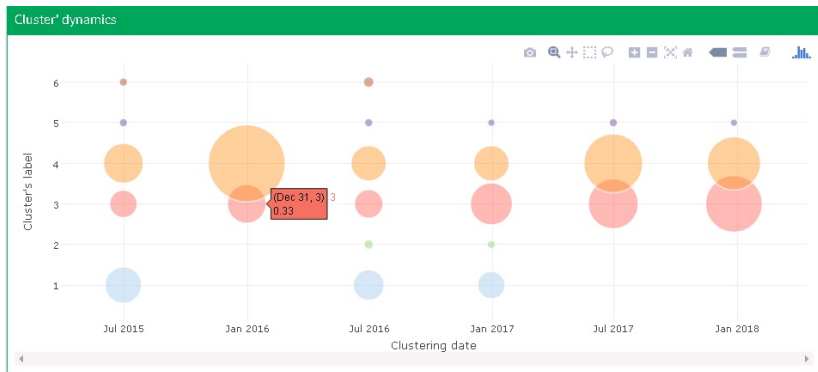
Changes in the SQ ranking

	Trading profile	Historical number of active clients per cluster	Historical % of active clients per cluster	Historical trading revenues per cluster, mln CHF	Historical trading revenues per cluster, %	Old SQ fees	New fees	Old SQ ranking	New ranking	Rating change
1	Passive					64.8	64.8	3	3	0
2	Occasional	48065	95.75	14.61	67.83	669.17	678.17	5	5	0
3	Frequent	2172	4.24	6.83	31.71	3831.56	3421.56	7	5	2
4	Day(heavy)	8	0.02	0.1	0.46	81245.88	73645.88	3	2	1

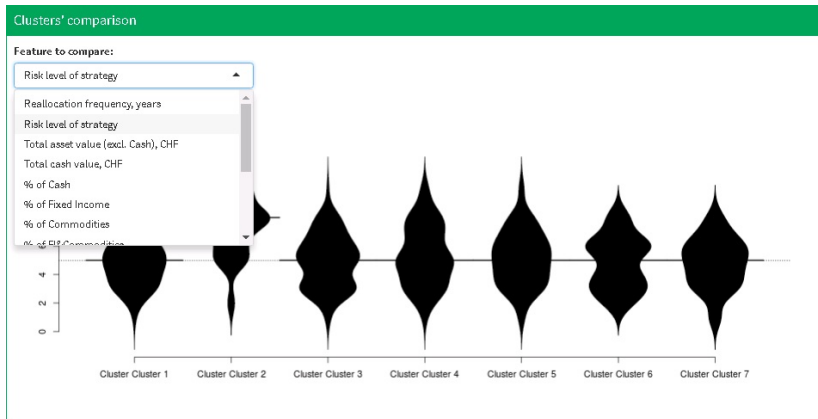
CLUSTERING TOOL 1



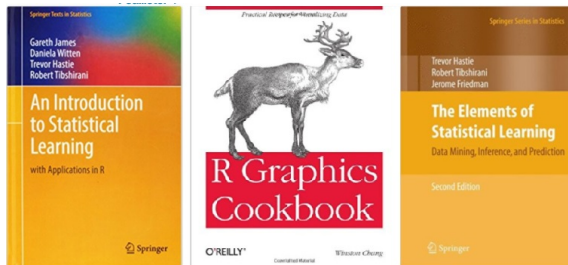
CLUSTERING TOOL 2



CLUSTERING TOOL 3



USEFUL BOOKS AND WEB-RESOURCES



- ▶ <http://r-statistics.co/Top50-Ggplot2-Visualizations-MasterList-R-Code.html>
- ▶ <https://cran.r-project.org/web/views/>
- ▶ <https://cran.r-project.org/bin/windows/contrib/checkSummaryWin.html>