

H2020 Infinitelch Stakeholders' Workshops Series

*An Automated, Personalized Investment
Recommendation System
for Retail Customers*

Tuesday, March 16th 2021



ΕΘΝΙΚΗ ΤΡΑΠΕΖΑ

National Bank of Greece has 180 years of successful operation

ΕΘΝΙΚΗ180



key figures



538
branches



~ 1 bil.
transactions



~ 26 mil.
accounts



~ 6 mil.
active
customers

NBG will implement an Automated Personalized Investment Recommendations system in a 4 staged approach:

01 Infrastructure, data sources and asset categorization

02 1st service of the Project: Generating the Investment Risk Profile

03 2nd service of the Project: System for personalized investment recommendations

04 Implementation of the investment recommendation

NBG will collaborate with Partners of the Consortium, for the following services:

DB & ETL: LeanXCale, UbiTech
Unstructured Data Analysis: ReportBrain
Machine Learning Algorithms: University of Glasgow
GUI Creation and Technology Integration: Crowd Policy



From raw data to the investment recommendation: High-level overview of the mechanisms involved

Step 1a) Customer Data:

- NBG PSD II data



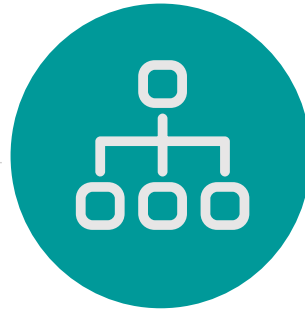
Step 2) Customer Investment Profiling:

- willingness and ability to invest
- available balance for investment
- risk appetite
- investment time horizon



Asset Data:

- Asset class
- Risk/return characteristics
- Historical performance



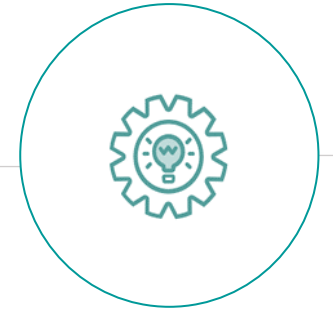
Step 1b) Asset Categorization:

- Create classes of investment products according to their levels of risk, returns, liquidity and maturity



Step 3) Recommendation engine:

- Match risk profiling with asset categories
- Incorporate regulatory compliance requirements and/or eligibility constraints
- Every customer will be matched with a set of recommended investment classes



Step 4) Communicate the recommended asset class,

based on:

- Suitability - calculated by the recommendation engine
- Market momentum, reflected on sentiment extracted from unstructured data
- Investment advisor input

improve performance with explicit feedback

01 - Data sources provided by NBG

Accounts Transactions Data

- All deposit account transactions, including investment and non investment - related transactions

CRM Data

- age
- product holdings

Cards Transactions Data

- How customers transacted using their cards – at POS, ATM etc.

Assets Data

- publicly available assets-related data such as price evolution, duration etc.

02 - First service of the Project: Generating the risk profile

By analyzing customer's transactions...



Accounts Transactions Data

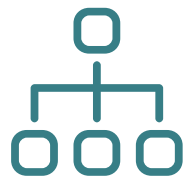


Cards Transactions Data

we will extract the following information...

The **investment - related transactions** will be combined with the customer's everyday transactions in order to generate the full **risk profile**.

...in order to reach a complete understanding of customers' risk capacity and aversion



Customer Investment Profile:
Risk Capacity & Risk Aversion



Indicative Profiles:

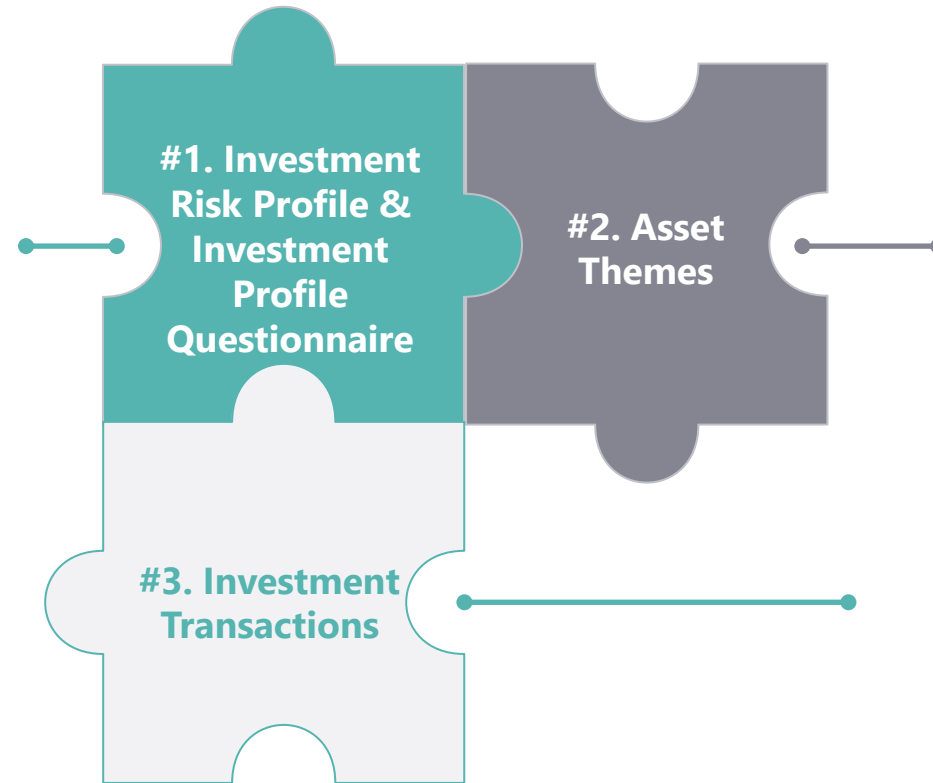
- Risk Averse
- Moderate
- Moderately Aggressive
- Aggressive

03 - Second service of the Project: System for personalized investment recommendations

In order to build the main tool of the Pilot, the investment recommendation system, NBG will use 3 input elements:

#1a. Investment Risk Profile

The output of the 1st service of the Pilot (the Investment Risk Profile of each customer) will be a basic input for the recommendation engine. consideration



Identification of Asset Themes

- The Assets will be grouped into Themes, each containing homogenous assets with respect to risk, return, minimum investment amount, level of control, liquidity etc.
- Example: Greek high-risk stocks, European mutual funds

#2. Past Investment Transactions

The investment – related transactions of the customers of the same Investment Risk Profile (e.g. Moderately Defensive) will be analysed in order to capture the unique investment preferences and patterns that differentiate them from customers of other Investment Risk Profiles.

The Personalized Investment Recommendation System output will be:



A list of investment proposals per customer, ranked by the degree of matching to the customer's Investment Risk Profile.

04 - Implementation of the investment recommendation

A list of investment proposals per customer

...**ranked** by the degree of suitability for the customer



Example:

- Equity Mutual Funds (rank 1)
- Corporate Bonds (rank2)

Unstructured data analysis input

News



Leverage on **ReportBrain** Input that provides

Blogs



- Economic **Sentiment** and
- market timing data



Feedback

- The **GUI** will explain why the recommended asset classes for a customer are **suitable**
- The RM will communicate the recommendations
- He will record the feedback for further enhancements



Decision Layer

- The **economic sentiment** will be incorporated into the investment recommendations algorithm
- The **ranking** will be updated accordingly
- **Eligibility constraints** that may exist will be applied



The GUI is developed by CrowdPolicy



Personalized Closed-Loop Investment Portfolio Management for Retail Customers



USERNAME

LOGIN

Remember me [Forgot your password?](#)

Personalized Closed-Loop Investment Portfolio Management for Retail Customers

29018367900

Information

Investment Recommendations

BOND CORPORATE
20.000
20.000
OPENING CLOSING

COMMON STOCK
20.000
20.000
OPENING CLOSING

MUTUAL FUND
20.000
20.000
OPENING CLOSING

Back

COMMON STOCK ▼+ ▼+

MUTUAL FUND ▲+ ▲+

The main goal is to preserve and maintain his capital. He invests in low risk assets

more info

Indicative screens

Personalized Closed-Loop Investment Portfolio Management for Retail Customers

29018367900

Information

29018367900
CUSTOMER CODE

22/02/1963
DATE OF BIRTH

MALE
GENDER

BALANCED
RISK PROFILE

Current portfolio

14.877 BOND CORPORATE

29.472 COMMON STOCK

5.173 MUTUAL FUND

9.845,45 €

Investment proposals

	TREND	SENTIMENT
BOND CORPORATE	▲+	▲+
COMMON STOCK	▼+	▼+
MUTUAL FUND	▲+	▲+

more info

Balanced

The main goal is to preserve and maintain his capital. He invests in low risk assets

The added value of this Project has 3 dimensions

	<u>The Investment advisor</u>	<u>The Retail customer</u>	<u>The Bank</u>
The topic addressed	<i>How to recommend the right investment products to the right investors</i>	<i>The personalization of investment recommendations is a privilege of the highest-value customers only</i>	<i>Investment products penetration to the Retail customers</i>
The goal	<i>Every customer will be assigned to investment classes that are suitable to them</i>	<i>Guide the Retail customers to targeted investment choices, even the less experienced ones</i>	<i>Ensure that the investment recommendations are more acceptable from the customer's side</i>
The value added	<i>Investment advisors' productivity increases thanks to better recommendations.</i>	<i>Better customer experience</i>	<i>Increase the trading volumes and customer revenue</i>



NATIONAL BANK
OF GREECE