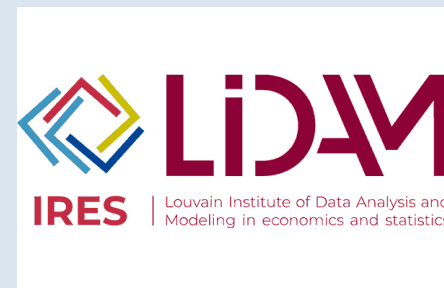# An intelligent information system for pension communication
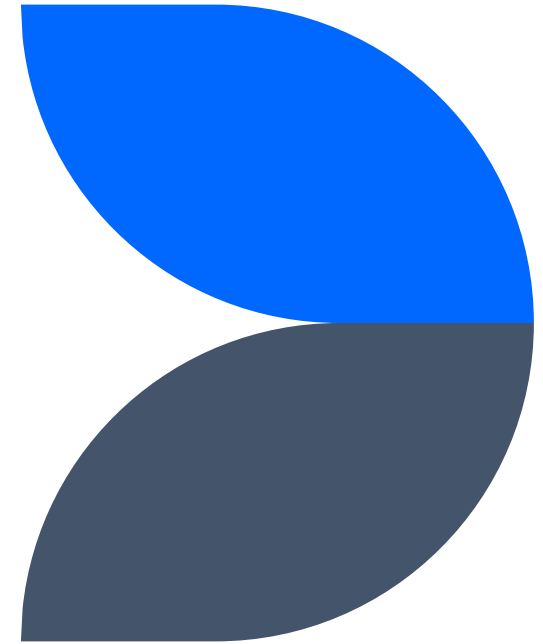# –
the Belgian case study

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Agenda

1. Context & Situation of pension communication

2. Needs and expectations

3. Situation AS-IS

4. Design of the system to be

5. Attention points

6. Future work

1. Context & Situation of pension communication

Context

Pension systems in Europe **-> several major challenges** (demographic problems, fewer people in the labor market, financial crises, etc.) **-> numerous reforms**

Through these reforms, we have observed :

- **A transfer of risks and responsibilities in the hands of individuals**

- A need to **make individuals more active and committed** in their retirement investment choices

BUT:

- **Individuals do not seem interested in pensions;**

- **Have little knowledge of the system** in which they find themselves;

- **Invest little or nothing time in building up their future retirement.**

Situation of pension communication

- Last 10 years -> digital communication

- Development of "*Pension Dashboard*"/"*Pension tracking Systems*"

- Dedicated workshops and task forces to deal with :
  - The strategic goal ("What is a good digital pension platform?"),
  - Tactical structure ("What are the needed functionalities?"),
  - Operational aspects ("how to design such platform?"),

- Currently: mostly informative systems

Challenges for the development of a digital platform-specific pensions:

- Complex systems
- Frequently changing environment
- Dealing with citizens' expectations and needs
- Many stakeholders' considerations and expectations
- Respect for the legislation
- Difficulties to reach (young) people
- Dealing with different pension phases (accumulation-decumulation)
- Dealing with different citizens profiles
- Low pension knowledge, low financial literacy
- People behavior considering pension (low interest, low willingness to invest time, complexity, aversion, procrastination..)

2. Needs and expectations (the Begian case)
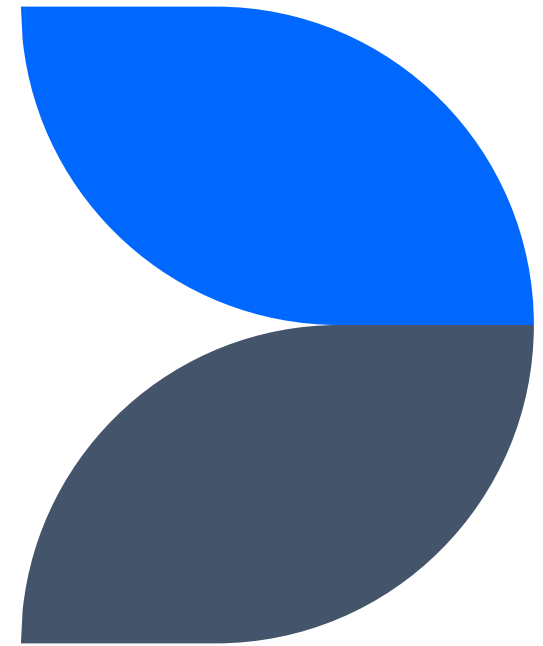
A qualitative research

- Belgian case

- Young people (18-40 years old)

- 18 people representative of the Belgian population

- Methodology: grounded theory

Design

1. The presentation of **important information in a summary / dashboard** directly available

2. **Adequate, logical, intuitive, meaningful and easy construction of the site**:
- a construction following the navigation logic of individuals
- adequate fonts and colors
- no scroll to see important information
- explicit titles and labels
- each page its usefulness

3. A **young, dynamic, attractive design**

4. Visual **harmonization and integration of all pension schemes**

5. A site p**urified of parts not applicable** to the situation of the individual and **parts without information.**

Quality of a PTS — Needs-focused individuals

Management /Security
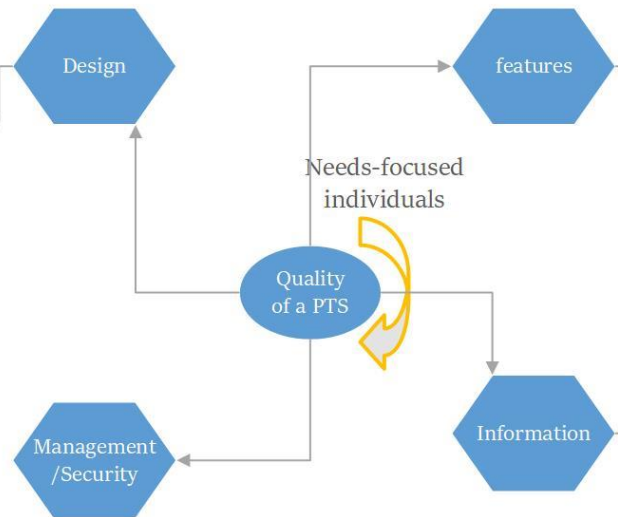
1. **Government involvement in the management of the platform**

2. No storage of all information at a private institution

3. Secure connection method

features

1. A simple and clear presentation of the **individual's current situation**:
- What has already been constituted in full and each separate pillar
- Retirement age
- The detail of the calculations
- A link with the career
- A projection at retirement age (total and separate net amount)

2. Features that help **contextualize, position and assess the current situation**:
- Averages to situate yourself
- Comparison of the projected situation with the potential needs at retirement

3. Features for **calculating the impact of certain choices** on the projected situation:
- Career change impact simulator
- Scenario analysis
- The impact [of the projects] of reforms on his situation

4. **Decision Support** Features:
- How to improve the current situation to reach such an amount
- Proposal of savings possibilities according to the individual's situation
- Presentation of the advantages and disadvantages of the choices
- Optimization (later standard of living, financial, fiscal)

5. A site that **automatically adapts to the person connected** and that is **personalized with targeted information**:
- Which links the information presented, the possibilities of simulations, the possible choices, to the specific situation and to the interests of the connected person
- Who gives explanations, simple and clear examples directly related to the situation of the person
- Who is aimed at young people, their interests and their priorities (in line with the priorities of young people, which explains the choices that can impact their pension)

6. **Comprehension support** features directly available:
- A question-and-answer site
- Directly available without searching
- Illustrations of the information shown with concrete examples
- Audio/video support during the consultation
- Reminder of how the system works and what the information relates to

Information

Summary of the expectations

- Not just a need of information!

- Need of system which is
    - Centralized (instead of decentralized work by different stakeholders)
    - Informative (general and personalized pension information)
    - Decisional (help to make the right choices according to situation and preferences)
    - Intelligent (deduce your situation, literacy level, risk aversion, credit situation...)
    - Adaptative (adapt content to your situation, characteristics)
    - Personalized (only give information interesting for you and your situation)
    - Deal with a lot of (personal) data from many data sources (private and public)
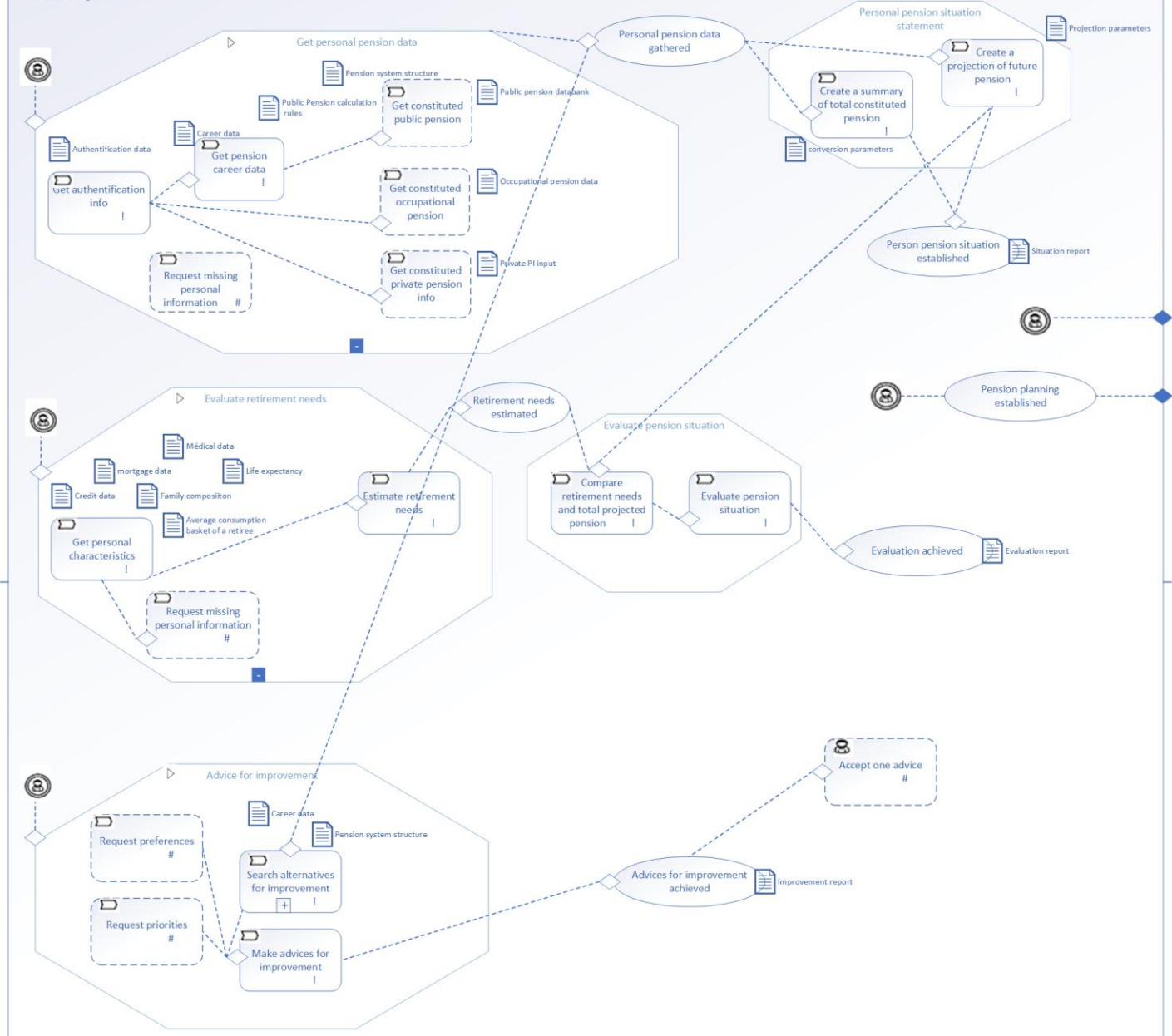
Definitions from our qualitative research

- Pension = 1+2+3 pillar

- Pension amount = 1+2+3 pillar, projected at pension age, net

- Pension planning= current situation+ projection of the current situation at pension + impact of some choices + evaluation of current situation + advices/possibilities to improve
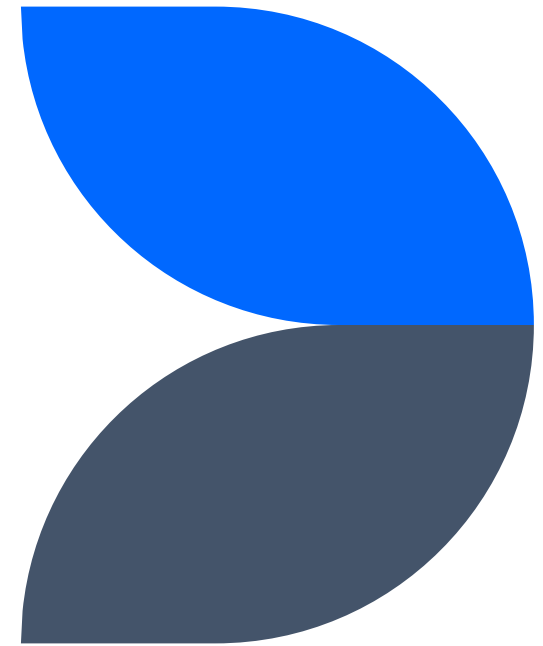
The pension planning process

Succession of different task:

- Establish current situation -> how much do I have?

- Establish a projection of the current situation at pension age -> How much it will be at pension age without changes?

- Evaluation projection of current situation according to future needs

-> will it be enough?

- Simulate the impact of some choices on the current situation -> What if…

- Propose alternatives -> How can I improve my situation? What are my possibilities?

Pension Planning File

Get personal pension data

- Authentification data
- Get authentification info
- Career data
- Get pension career data
- Public Pension calculation rules
- Pension system structure
- Get constituted public pension
- Public pension databank
- Occupational pension data
- Get constituted occupational pension
- Request missing personal information #
- Private PI input
- Get constituted private pension info

Personal pension data gathered

Personal pension situation statement

- Projection parameters
- Create a projection of future pension !
- Create a summary of total constituted pension !
- conversion parameters

Person pension situation established
- Situation report

Evaluate retirement needs

- Médical data
- mortgage data
- Life expectancy
- Credit data
- Family compositon
- Average consumption basket of a retiree
- Get personal characteristics !
- Estimate retirement needs !
- Request missing personal information #

Retirement needs estimated

Evaluate pension situation

- Compare retirement needs and total projected pension !
- Evaluate pension situation !

Evaluation achieved
- Evaluation report

Pension planning established

Advice for improvement

- Request preferences #
- Career data
- Pension system structure
- Search alternatives for improvement + !
- Request priorities #
- Make advices for improvement !

Accept one advice #

Advices for improvement achieved
- Improvement report

3. Situation AS-IS (the Begian Case)

The Belgian pension system

3 different pillars: (1) The public pension (1st pillar); (2) The occupational pension (second pillar); (3) The private pension (third pillar).

Different stakeholders are concerned by the management and the organization of these three different pillars according to their professional status (employee, self-employed, civil servant):

- The public pension: the Federal Pension Service (FPS), The National Institute for the Social Security of the Self-employed (NISSE);

- The occupational pension: Sigedis, employers, professional sector, private pension institutions;

- Private pension: private bank or pension institutions. Each pillar has its own legislation according to the professional status (civil servant, self-employed, employee).

Each part is **controlled separately**,

Each part has its **own structure, rules, and calculation**.

How can people plan their pension today?

How they collect the info to be able to make their pension planning today?

- For general information about the public pension -> website of Federal Pension Service (FPS), website of The National Institute for the Social Security of the Self-employed (NISSE) (only for self-employed)

- For general information about the occupational pension -> website of The Financial Services and Markets Authority (FSMA), private pension institutions, Sigedis, NISSE (only for selfemployed), pensioplus, assuralia

- For general information about the private pension-> private pension institution;

- For personal information about public pension-> FPS pension advisor, mypension, 1st pillar annual statement

- For personal information about occupational pension-> mypension.be, 2de pillar annual statement

- For personal information about private pension -> provider (bank/pension institution), 3de pillar annual statement

- For advice about pension planning concerning the public pension (evaluation of its situation and advice to improve it) -> some simulations on mypension.be, FPS pension advisor;

- For advice about pension planning concerning the occupational pension (evaluation of its situation and advice to improve it) -> private pension institutions, broker;

- For advice about pension planning concerning the private pension (evaluation of its situation and advice to improve it) -> pension advisor;

Evaluation/difficulties of the situation AS-IS

- Complex structure divided into pillars which differs according to the professional status;

- Many changes in the system over time (structure, rules, and parameters);

- Many sources of information according to the pillar and professional status;

- Many and different stakeholders according to the pillar and professional status;

- Many different data sources according to the pillar and professional status;

- Difficult to get an overview (independent of the complexity of the system and independent of the professional status);

- Difficult to get advice (call different institutions or delegate the task to a broker);

- Advice from private institution or broker = risk for the neutrality

-> Require so much initiative, investment, time and actions from the citizen >< behavior of citizen in the pension environment

The current digital pension platform

- It exists a digital pension platform but:
  - Concerns only 1st and 2d pillar (no 3d)
  - Pillars are presented separately
  - No global overview/projection
  - No projection/simulation 2de pilar
  - No evaluation
  - No advice
  - No personalization of the information
  - No adaptation to the financial/pension literacy

4. Design of the system TO-BE (the Belgian case)
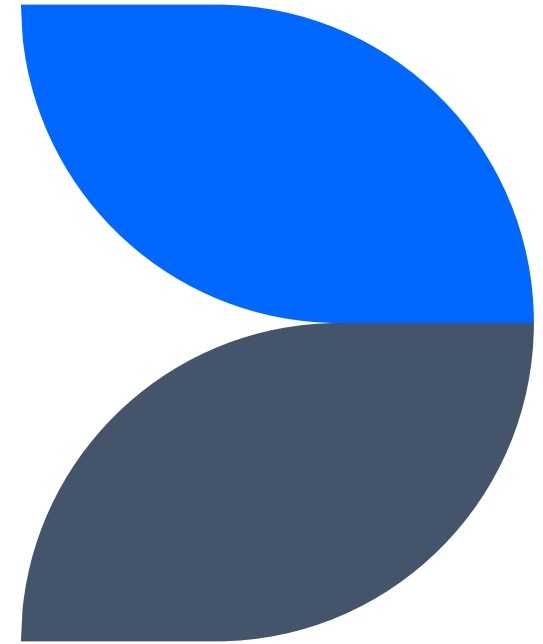
*Requirement engineering with I**

Designed by Eric Yu in the early 90s as his PhD thesis

For representing, modeling and <u>reasoning about socio-technical systems</u>

Goal and agent-oriented

2 phases
1. Actor based (analysis of each actors, intentions and dependencies independently of the system to be)
2.System based (analysis of the system to be)

2 models
1. Strategic dependency model: answer the *why* and *what* questions
2. Strategic rational model: answer the *how* question

I*

Step 1: actors oriented

Definition of the stakeholders

Interview to catch stakeholders' intentions

Translate interview in goals/qualities/tasks

Analyze dependencies between actors:
Strategic dependency model

Means ends analysis inside each actor ->
strategic rational model

Step 2: system oriented

the system among the stakeholders and
transfer of responsibilities to the system

The *why* & *what* questions -> functional and
non-functional requirements of the system to
be -> strategic dependency model of the
system to be

The *How* question -> strategic rational model
of the system to be
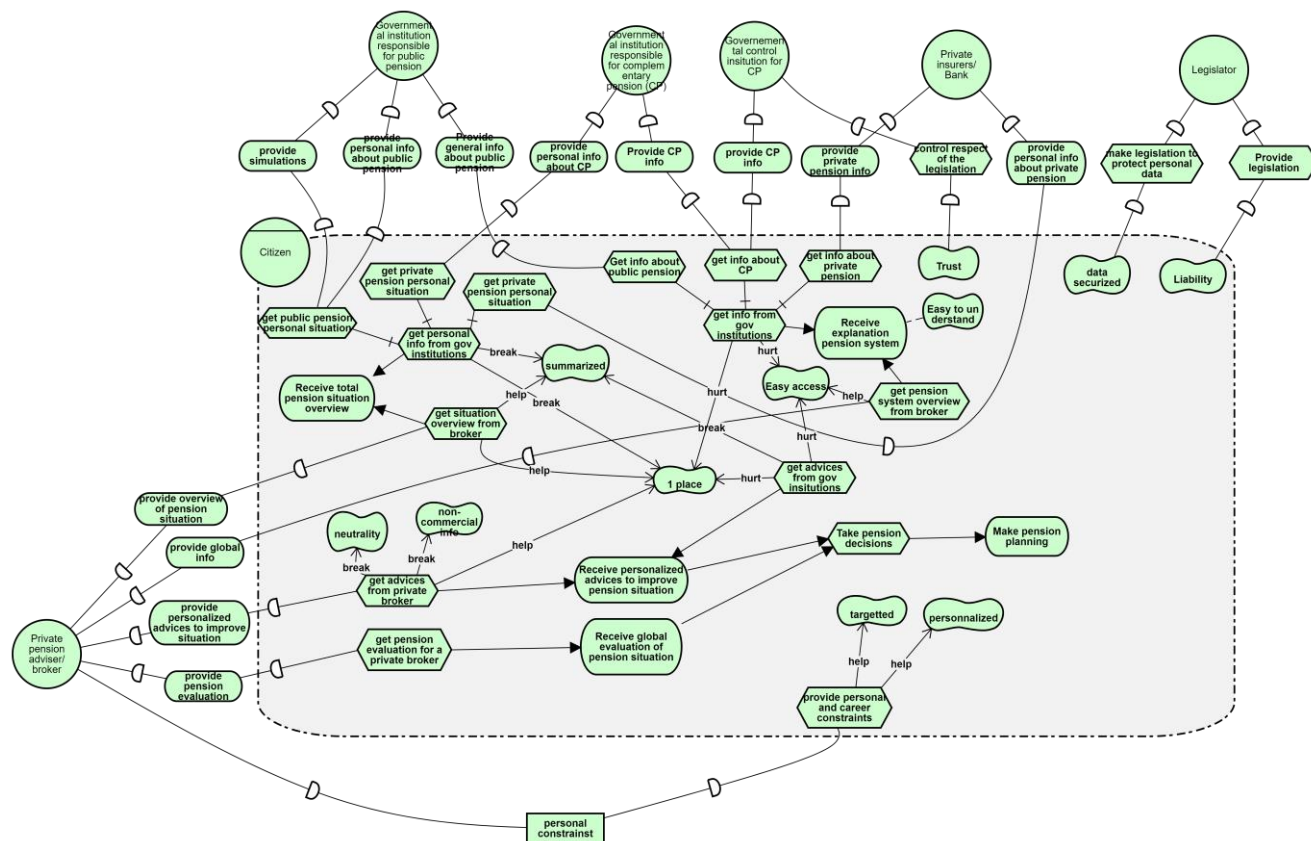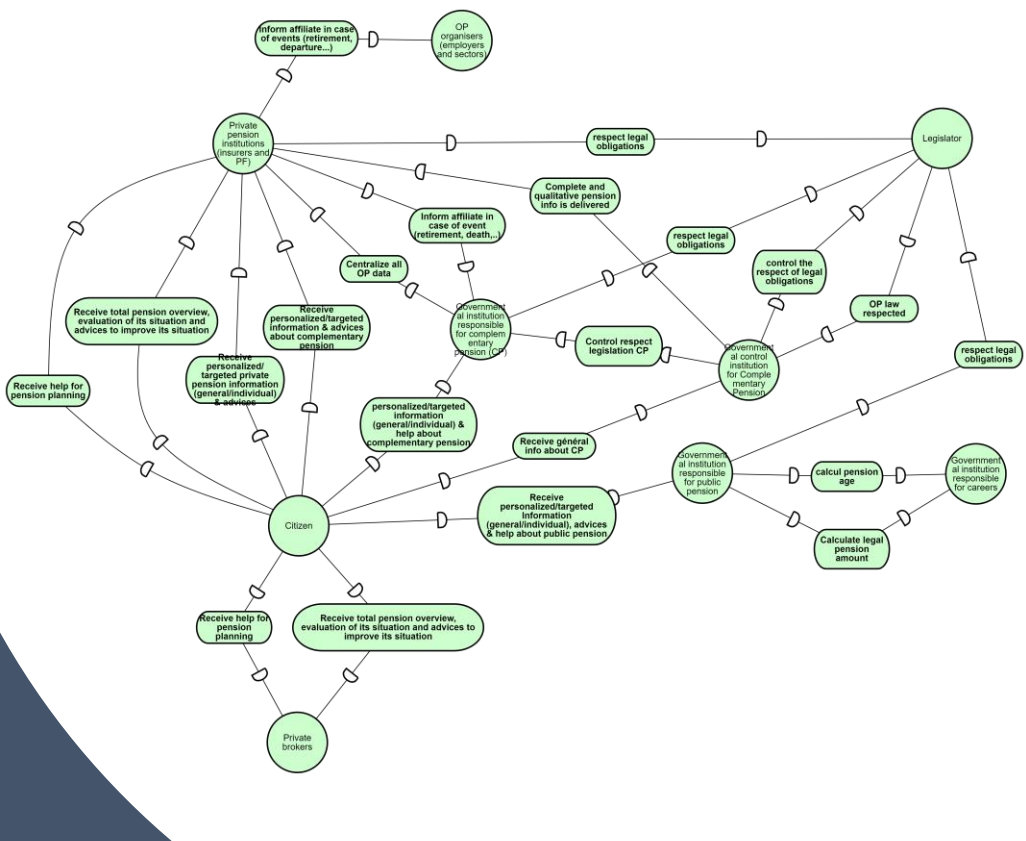
The system to be
–
functional and nonfunctional requirements
–
what and *why* questions
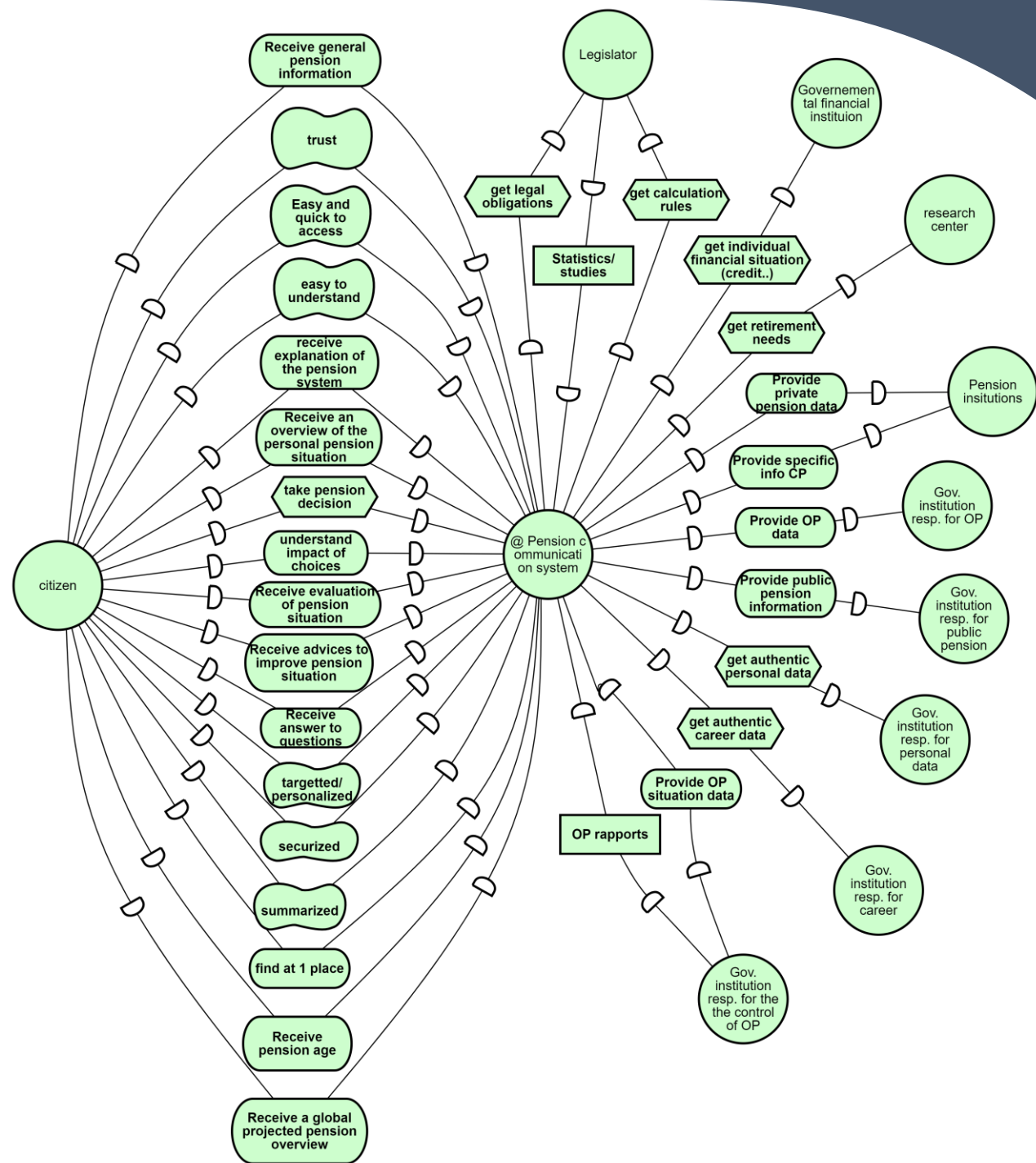
The system TO-BE
—
final model
–
how question
–
Agent-oriented
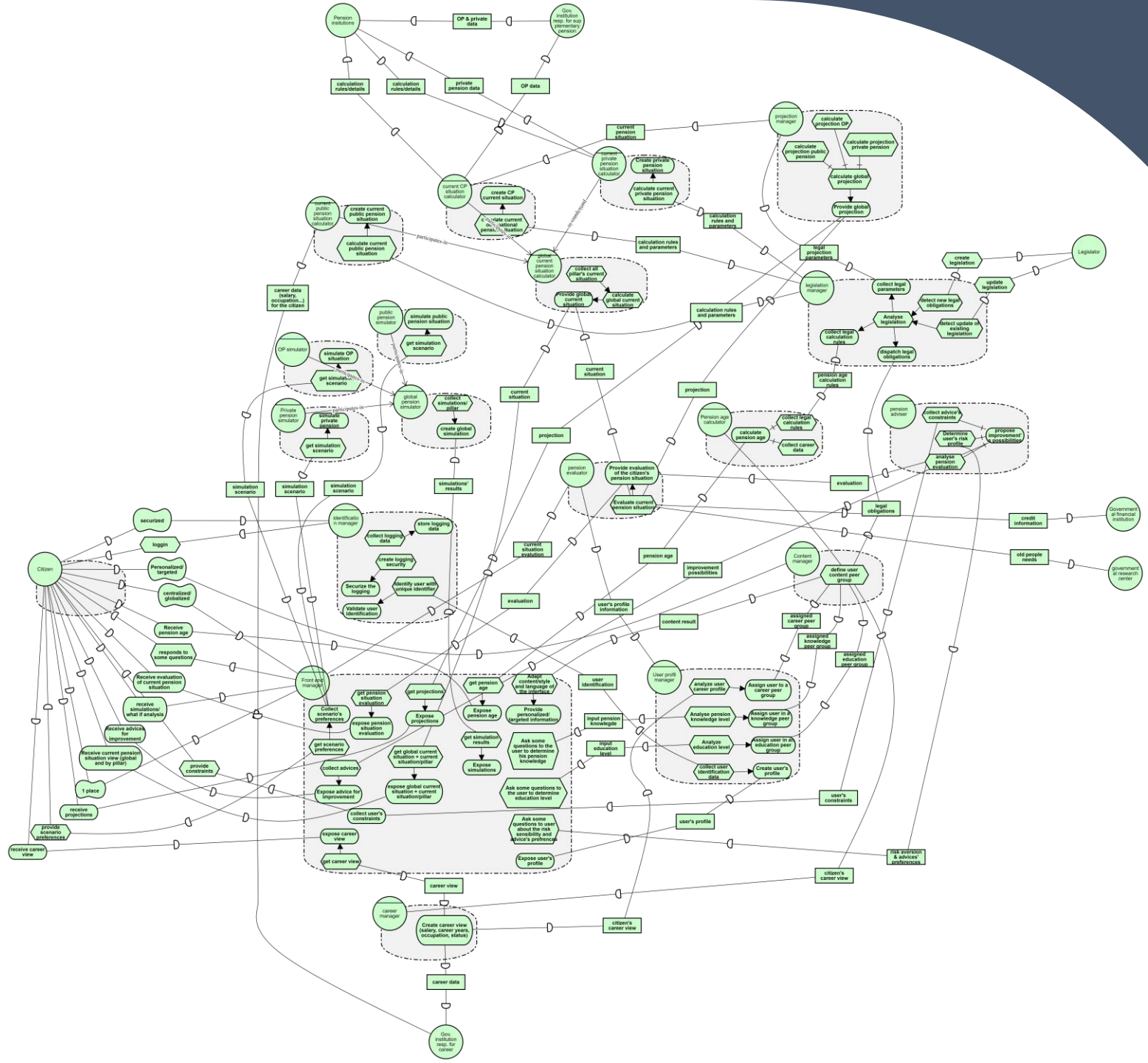
# A system with interconnected independent and autonomous agents

- Decomposition of the tasks and the complexity;

- Decomposition of the decision support;

- Each agent has its own task and objective and can work totally independently;

- The final system works through the interconnection of these different independent agent.

Different kinds of agents

- Totally independent and autonomous

- Partially independent and autonomous (need as input, the output of other agents)

- Agents which interact with the user

- Agents which interact with external databases

- Agents which collect/gather info

- Agents which apply calculation rules and decision tree

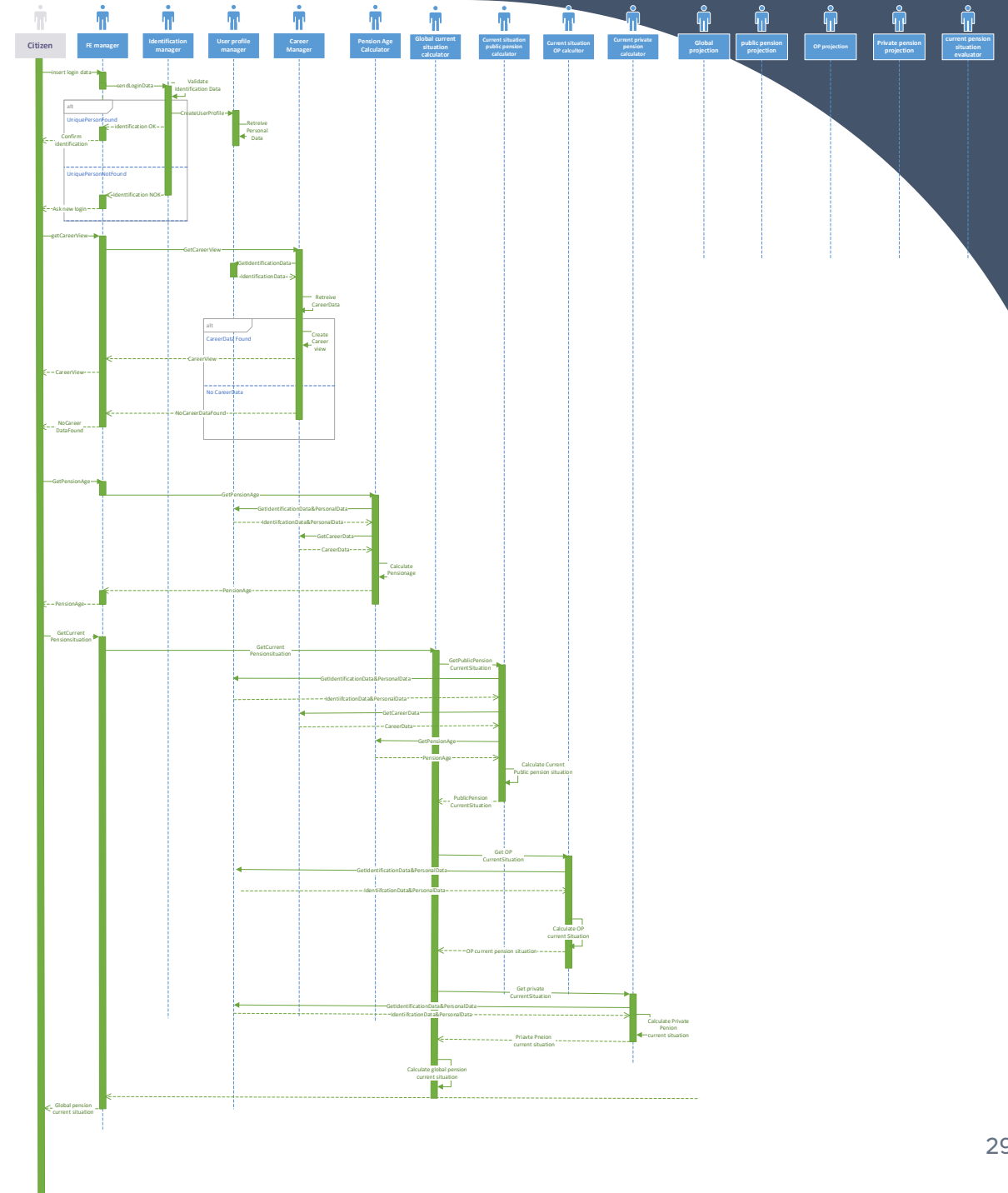- Intelligent Agent which create new knowledge by themselves

I* in a software development process

**Tropos with an Iterative Life Cycle : I-Tropos
(Wauthelet, Kolp, 2011)**
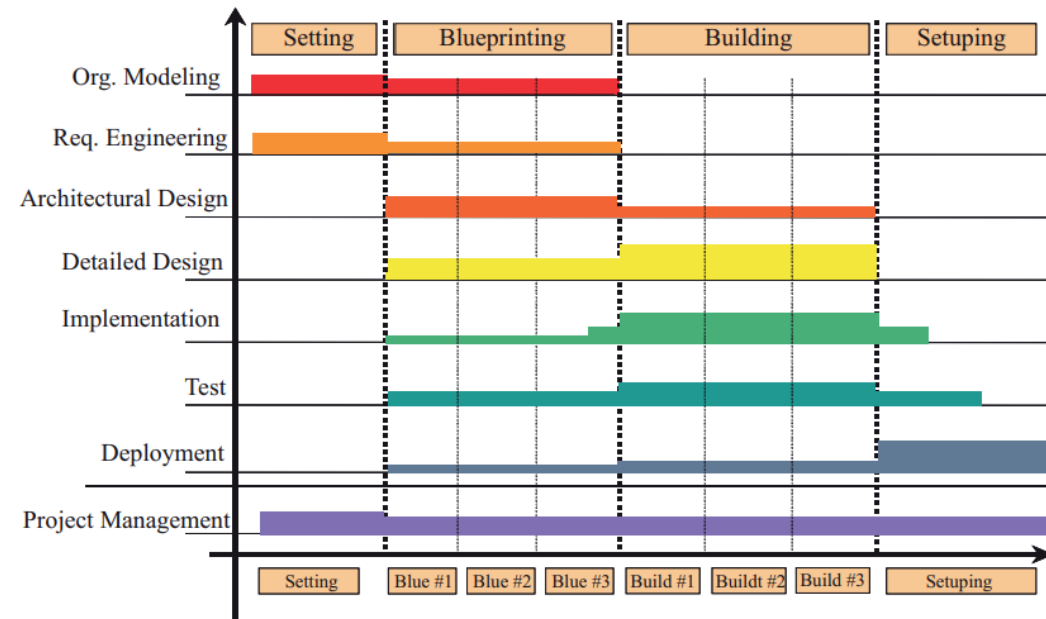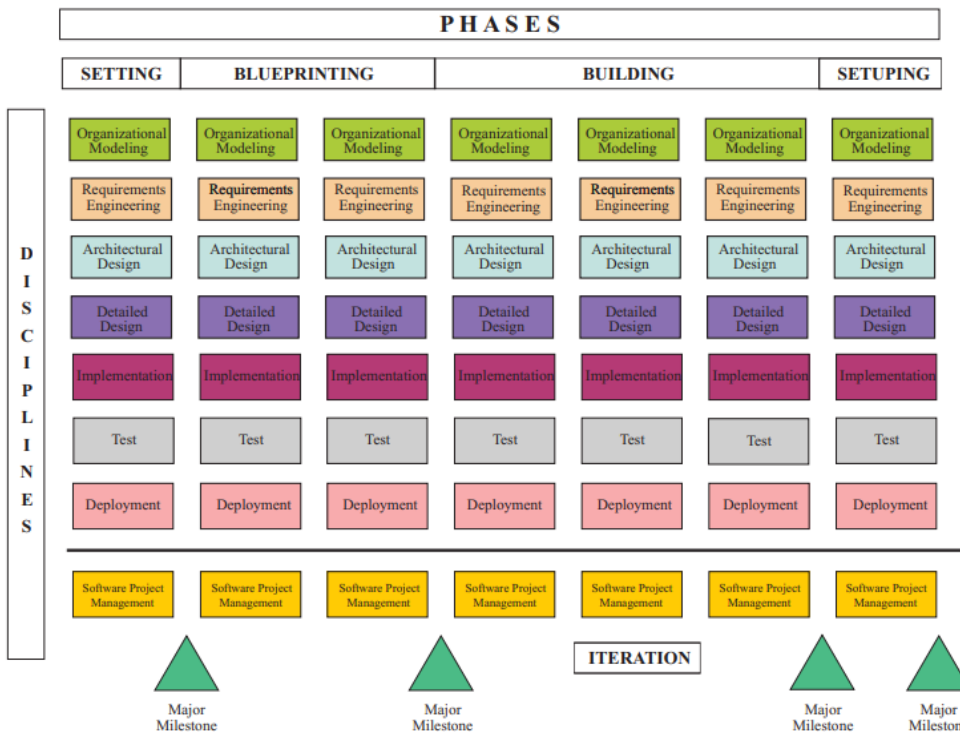
Detailed design- Communication diagram

Example of communication diagram to illustrate communication between agents, some BR (sequence of tasks) and dependencies between agents

Need for dedicated business rules for each agents

Example of BR which must be defined based on our example of communication diagram:

- Identification:
  - When is a successful identification? -> decision tree/decision table
  - Datasource to validate?
  - How to access this datasource?

- Calculate pension age
  - Based on personal data (date of birth) + legislation

- Create career view:
  - Which year in the career view? What is a career year? Employee, self employed, civilservant?

- Get global current pension situation
  - What is global?
  - What is pension?
  - What is current for each pillar?
  - Alignment repartition-capitalization system...
  - What is amount? Gross? Net? Taxation rules?
  - How to calculate current public pension situation?
  - How to calculate current occupational pension situation?
  - How to calculate current private pension situation?

Use of DMN to model decision inside each agent

In addition to communication diagram, we can detail the BR using DMN and decision tables.
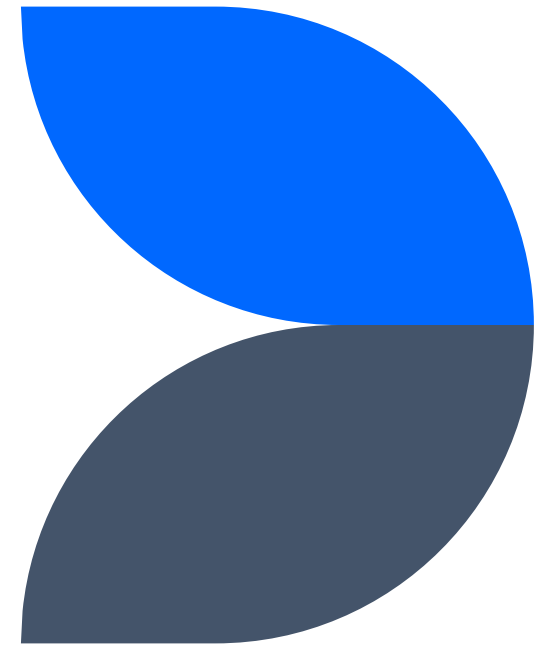
Simplified Example: GetGlobalCurrentPensionSituation
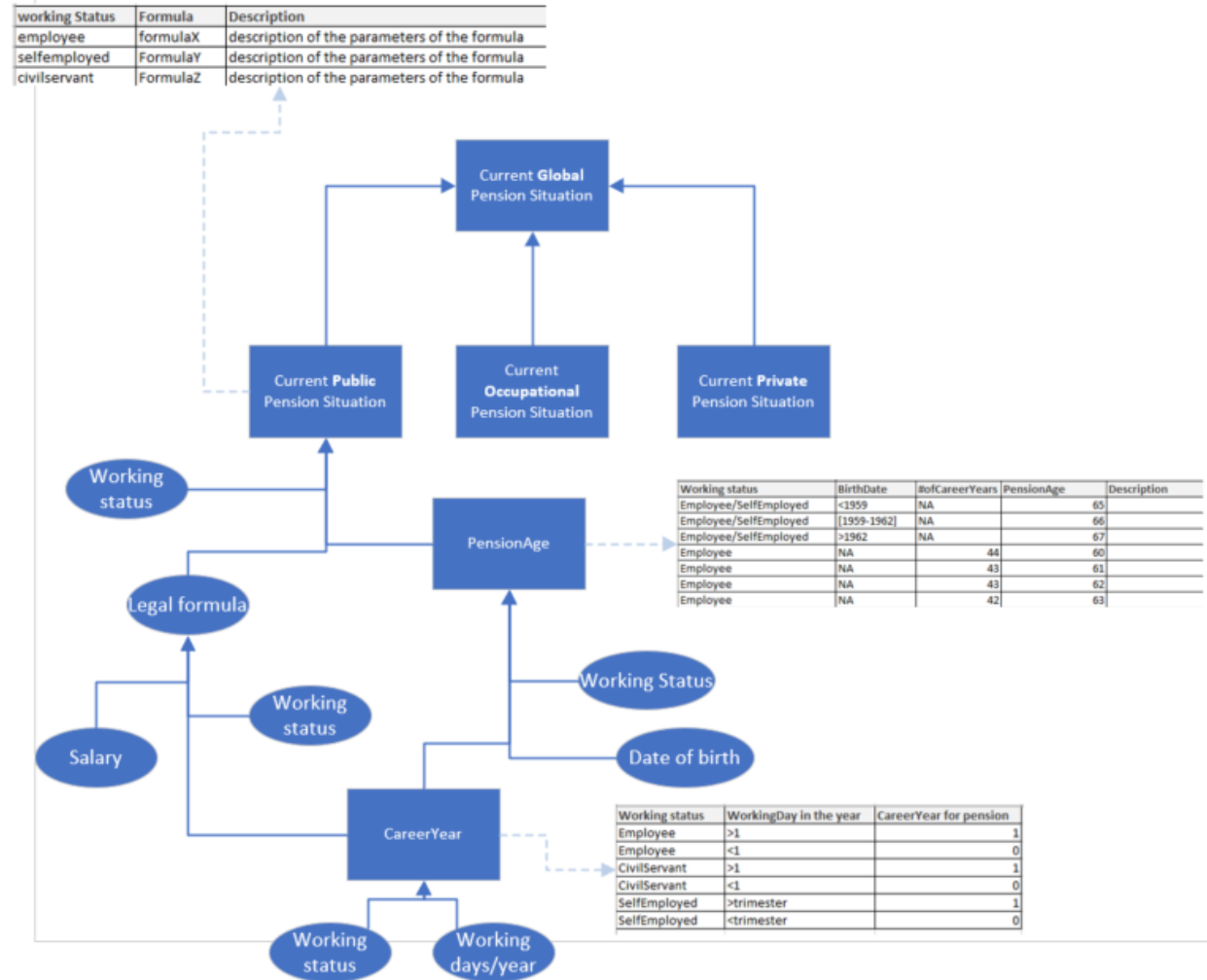
Add intelligence to the DSS

- The intelligence will allow to :
    - profiling
    - filter the content of the displayed information
    - adapt and filter the advices
   - propose preferences
    - advice government

6. Identified attention points

- The difficulty to model such system and all decision rules (need for business experts in the different domain)
- The black box effect
- The legal framework for such intelligent systems
- How to ensure the independence and neutrality of such system
- How to deal with the digital divide and the lack of human contact
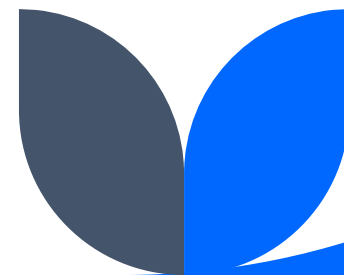
7. Future work
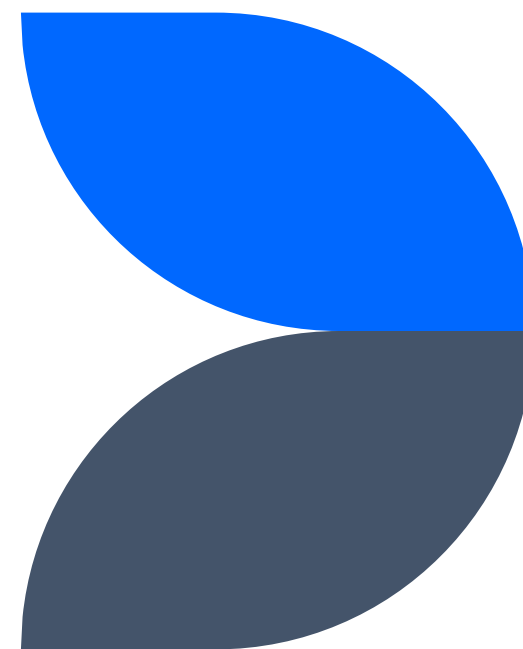
Thank you

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