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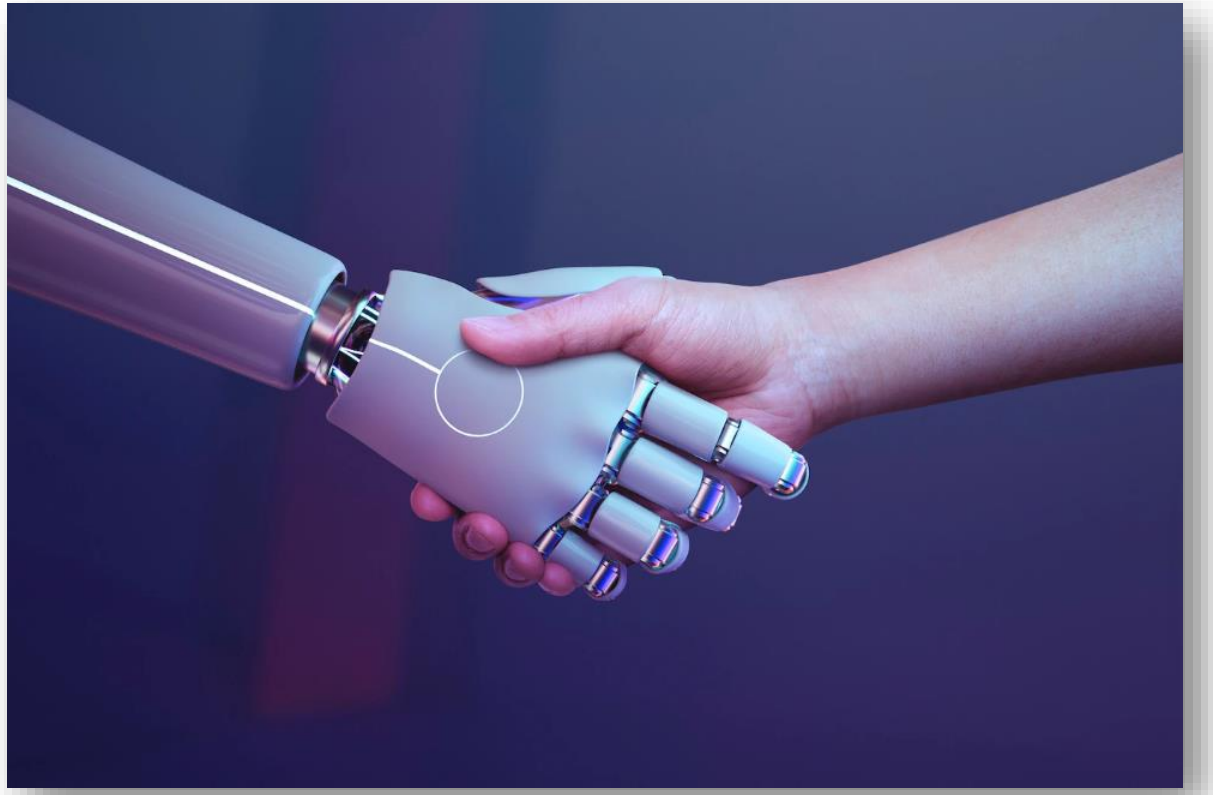
Machine learning based method for deciding internal value of talent



Dr. Edurne Loyarte-López
Organizational Strategy Director
eloyarte@vicomtech.org

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Vicomtech

Vicomtech-Validating Organization

Applied Research Centre

Specialized in **Artificial Intellingence and Visual Computing & Interaction**

+ 200 researchers

+ 70 PhD

Organizational growth

Problem Statement (I)

Study Cornestones:

- Internal equity as a critical element that directly affects employees' motivation*.
- Mitigation of human and machine bias**.
- Co-design by Data Scientists and HR Practitioners***.

Figure 1: Negotiation bias due to emotional thinking.

* Zhu et al. 2022; Ugarte and Rubery, 2021; Ng and Sears, 2017; Acker, 2006.

** Kahnemnan, 2013; Meehl, 2013; Hutchison and Mitchell, 2019.

*** Vassilopoulou et al 2022

Problem Statement (II)

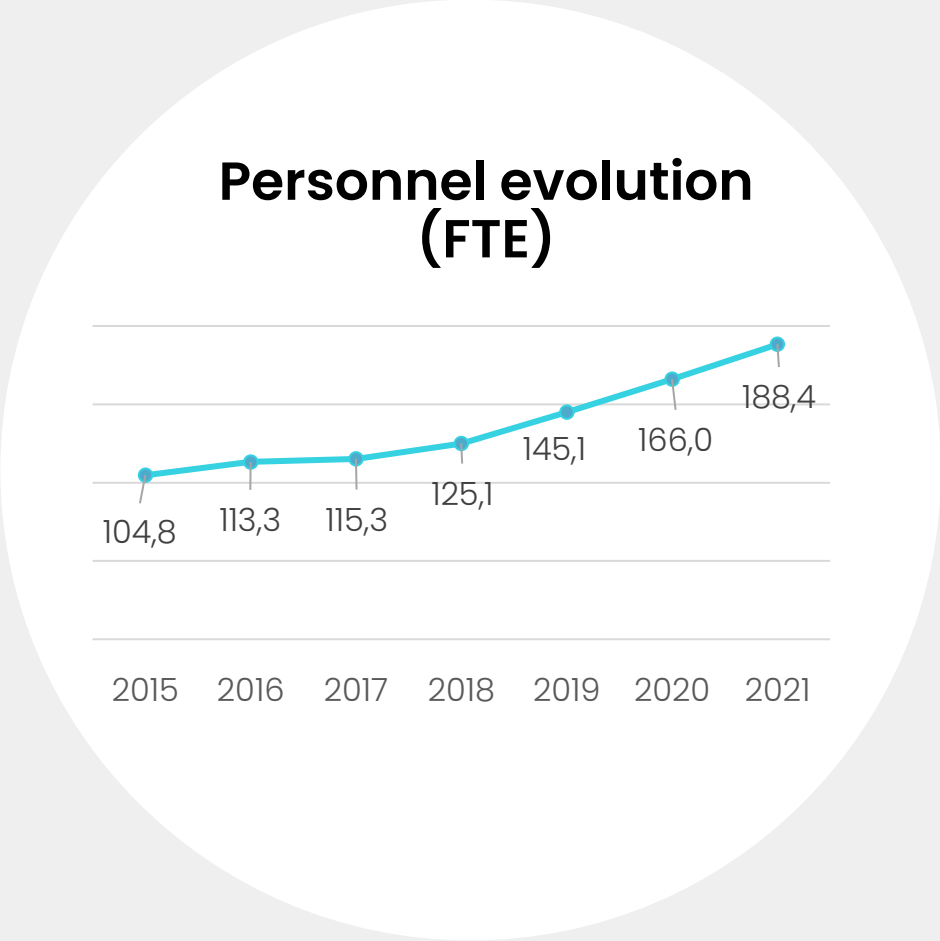

Figure 2: Personnel evolution (FTE).

Figure 3: Departures.

Methodology (I)

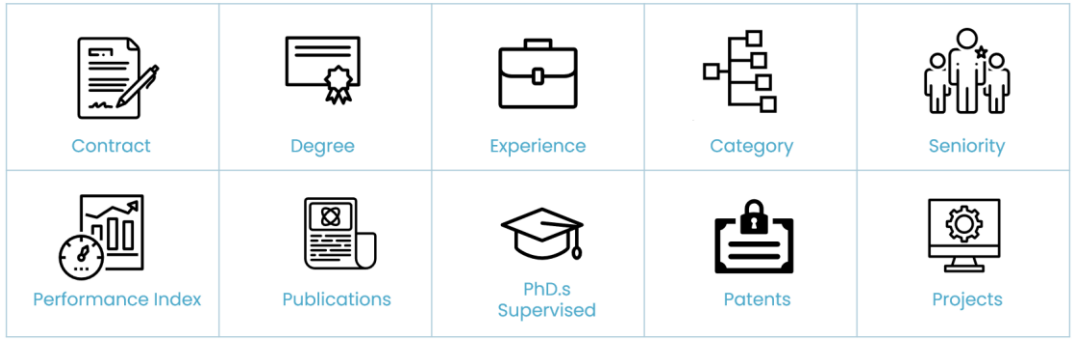

Figure 4: Salary determinant variables at the validating organization*.

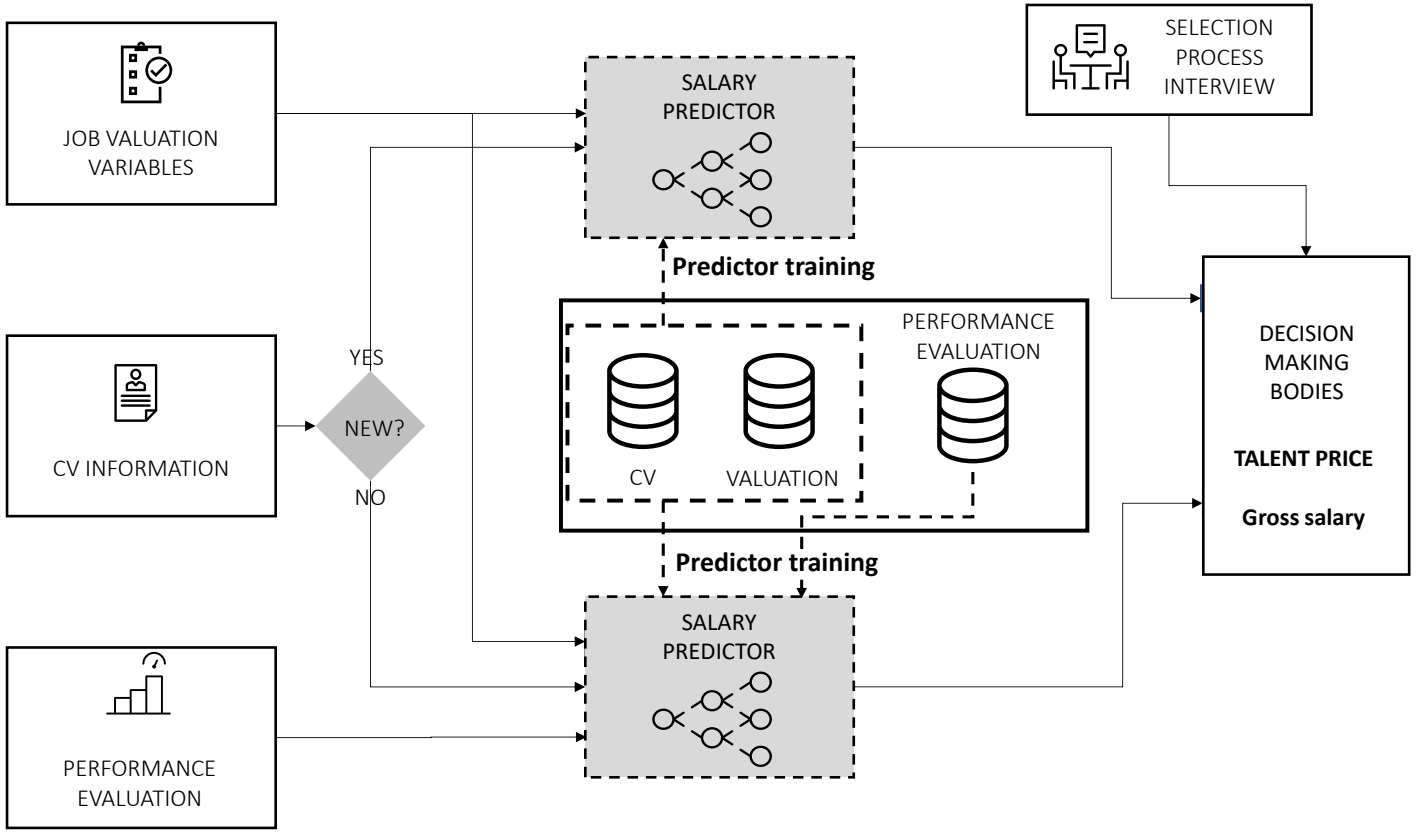

Figure 5: Employee salary decision framework.

*Loyarte-López, Edurne, Igor García-Olaizola, Jorge Posada, Iñaki Azúa, and Julián Flórez-Esnal. 2020. "Enhancing Researchers' Performance by Building Commitment to Organizational Results." *Research-Technology Management* 63 (2): 46–54. https://doi.org/10.1080/08956308.2020.1707010.

*Loyarte-López, Edurne, Igor García-Olaizola, Jorge Posada, Iñaki Azúa, and Julián Flórez. 2020. "Sustainable Career Development for R&D Professionals: Applying a Career Development System in Basque Country." *International Journal of Innovation Studies* 4 (2): 40–50. https://doi.org/10.1016/j.ijis.2020.03.002.

Methodology (II)

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Table 1: Training performance

Dataset	Samples	R2	Mean absolute percentage error	Percentage error variance
Recruitment	138	0,91	0,0375	0,003
Annual Salary Review	76	0,9	0,0496	0,004

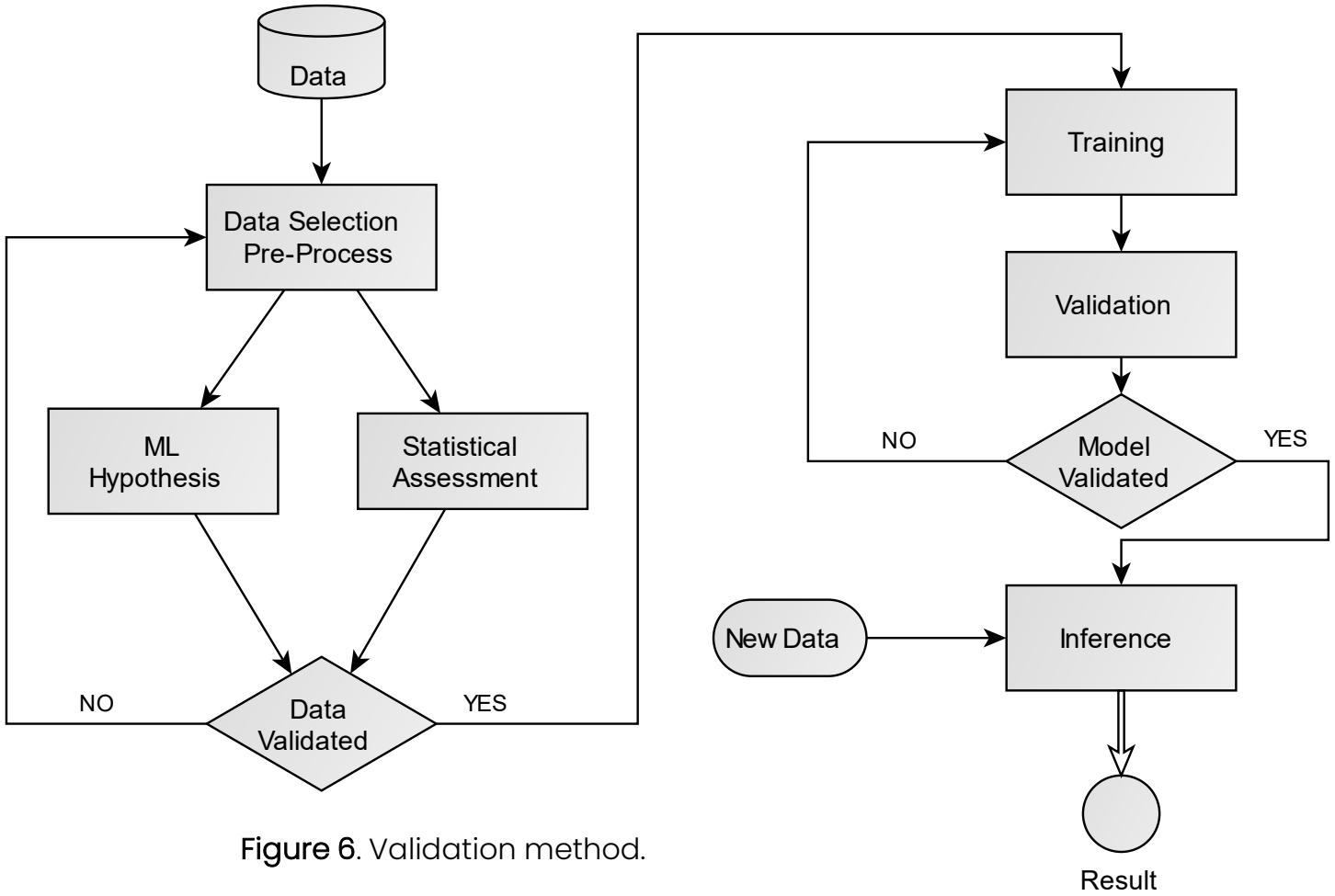

Figure 6. Validation method.

Table 2: Training and assessment variables

Salary Policy Training			Salary Policy Assessment
Contract	Education (PhD., Master, Degree, etc.)	Experience	Country of origin
Category	Publications	Patents	Reduction of working hours
Seniority	PhD.s supervised	Projects	Department
Performance Index (Scores)	Management Responsibilities		Gender

Salary Policy Assessment strategies

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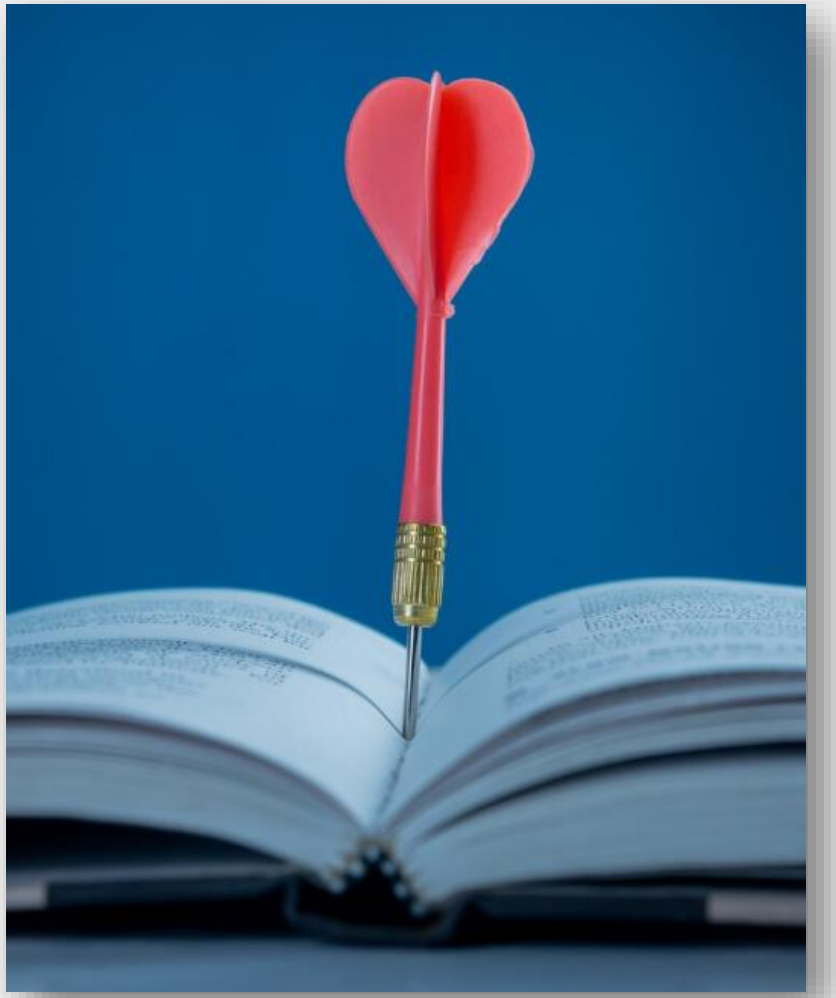
Our approach includes three different strategies:

- Visual analysis by dimensionality reduction techniques
- Explainability analysis of the prediction model
- Hypothesis testing by changing prediction model's input variables



Salary Policy Assessment: Visual analysis

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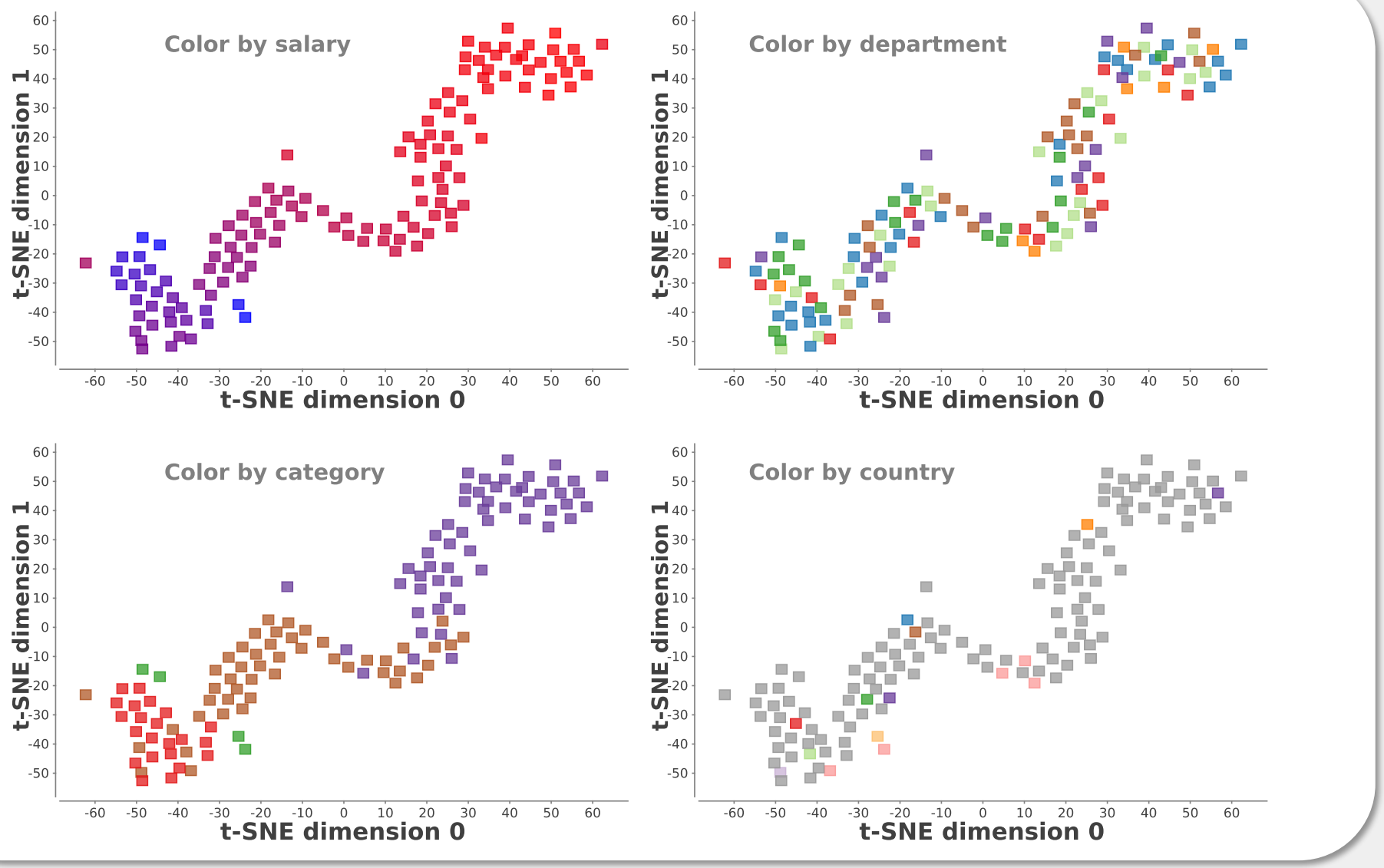

Figure 7: Salary Policy Assesment

Salary Policy Assessment: Explainability

Figure 8: SHAP Variable importance for RF (New recruitments) and GBR (salary review).

Salary Policy Assessment: Hyphotesis testing

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Contributions

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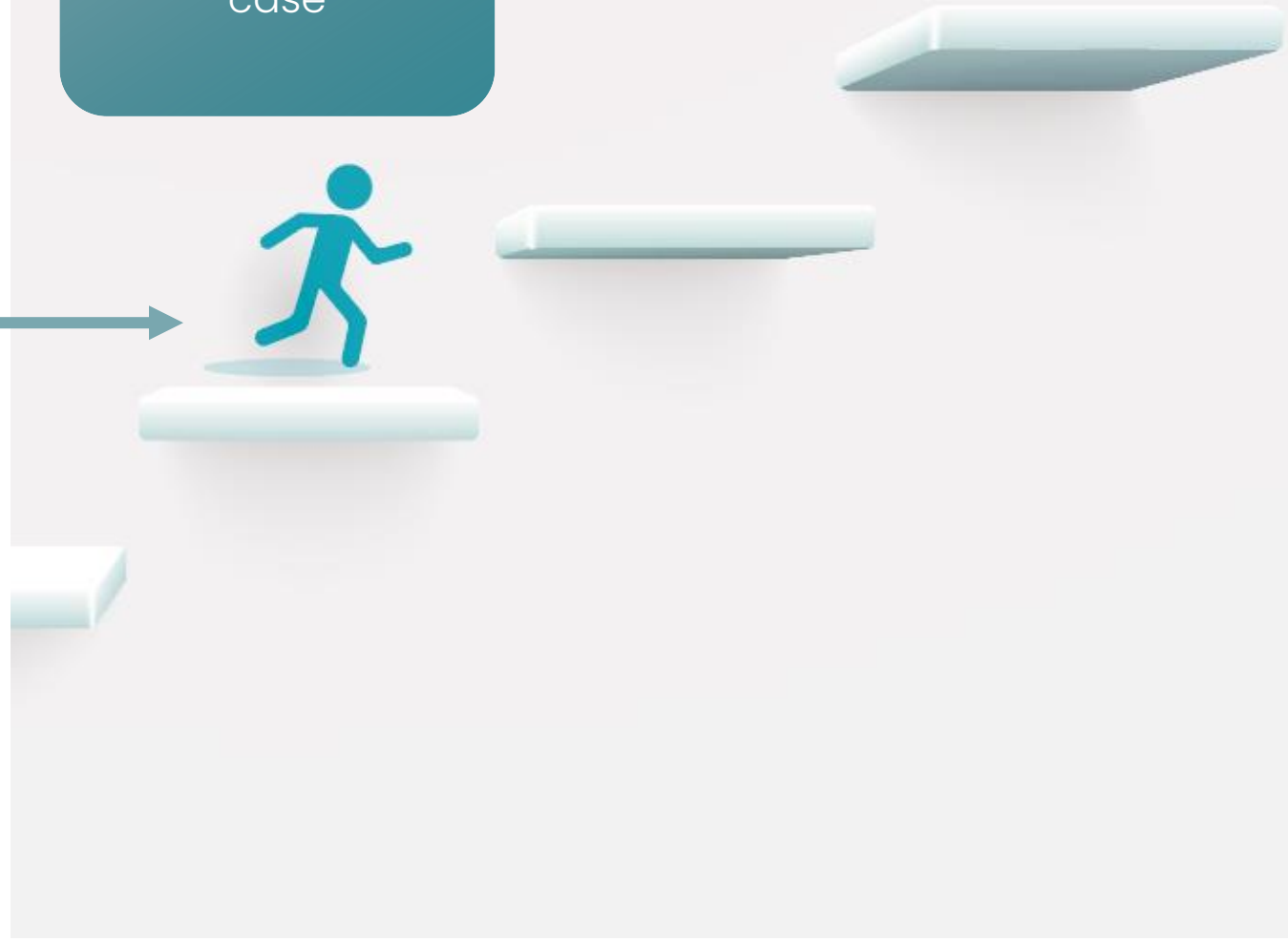
Validated by Data Scientists and HR Practitioners

AI successful real case



Internal equity achieved

Method designed to mitigate human and machine bias

Conclusions

Strengths

- This method is more accurate than a job evaluation (its talent is quoted). It allows fine tuning between salary bands.
- Method based on AI for deciding the internal value of talent and for evaluating the salary criteria.
- This method minimizes the subjectivity of decision-making bodies and ensures internal equity improving objectiveness and internal fairness.
- The predictor is already in use (practitioners).

Limitations

- It requires an advance and consistent HR data driven management.
- Focused on a practical and replicable work.

Impact

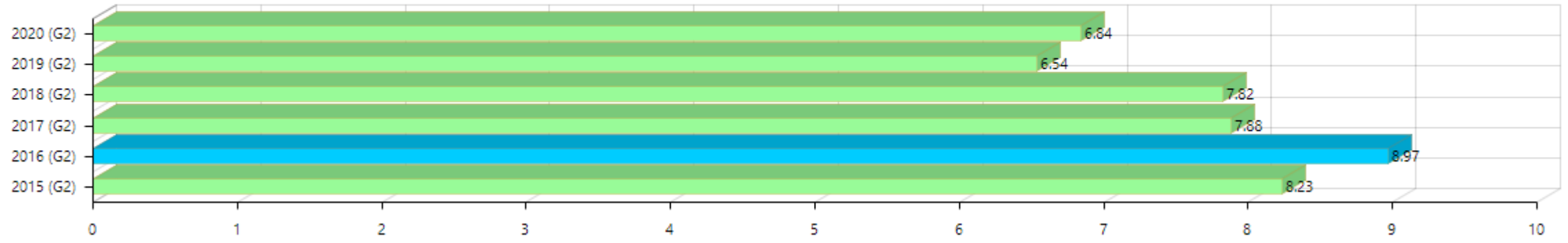
- Practitioners:
  - Successful AI real case
  - Extended to other organizations.
- Researchers:
  - Tested approach to contribute applied AI case (not theoretical scenario).

Individual career's field and simulation

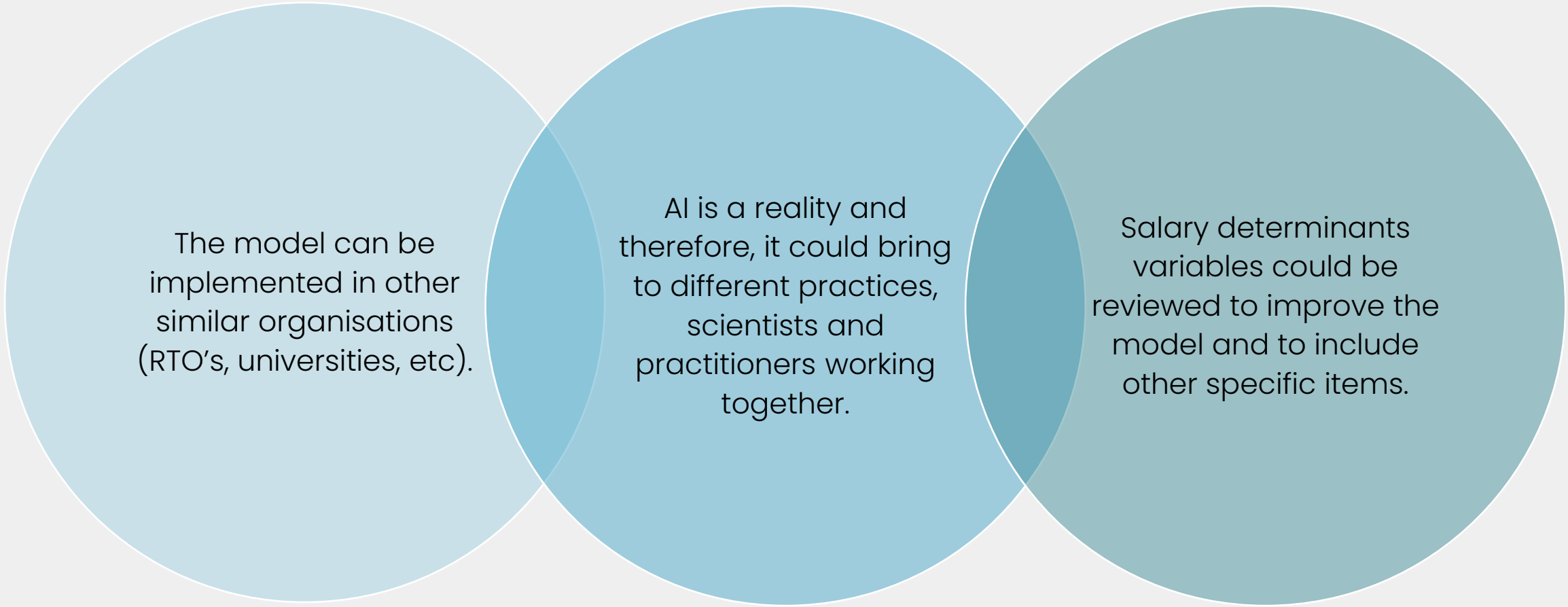
Simular la categoría G1 Simular

REQUISITOS PARA G2					
Formación: Título de Doctor	Experiencia profesional: Más de 4-5 años en investigación. Capacidad de liderazgo, aptitudes probadas para coordinación y gestión de proyectos	Difusión: Mín. 6 publicaciones indexadas	Idiomas: Dominio de inglés y castellano, hablado y escrito (a nivel de trabajo en equipos internacionales y redacción de documentos técnicos, artículos). Se valorará el conocimiento de otro idioma (euskera, alemán, francés,...)	Proyectos: Haber dirigido 5 proyectos de complejidad baja y 3 proyectos de complejidad media	Se valorará participación en patentes y en el desarrollo de tecnologías transferibles
✓	✓	✓	✓	✗	✓
Doctor por la Universidad del País Vasco	12 años en Vicomtech	16 publicaciones indexadas	Idiomas	7 Complejidad Baja 1 Complejidad Media 1 Complejidad Alta	3 Propiedad Intelectual
Si deseas actualizar los datos ponte en contacto con Administración	Añadir experiencia Homologar	Añadir publicaciones Homologar	Tecnologías de Soporte	Añadir proyectos Homologar	Añadir propiedad intelectual Homologar

HISTORICO DE DESEMPEÑO



Future work


The model can be implemented in other similar organisations (RTO's, universities, etc).
AI is a reality and therefore, it could bring to different practices, scientists and practitioners working together.
Salary determinants variables could be reviewed to improve the model and to include other specific items.

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THANK YOU

www. vicomtech.org

eloyarte@vicomtech.org