SADAKO
TECHNOLOGIES

short introduction

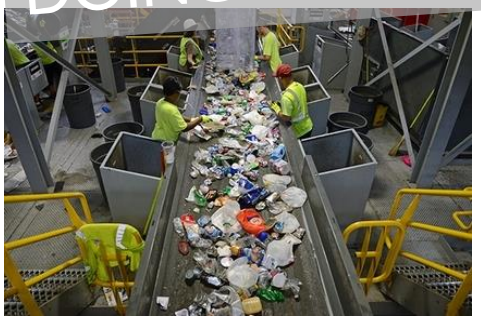
ARTIFICIAL INTELLIGENCE for the ROBOTIC RECYCLING REVOLUTION

1. Market need (I). Cutting human sorters costs

- Waste sorting plants are using machinery, but in every plant there are several (up to tens) human sorters doing some operations that current machines can not do in a cost-efficient way.
- Our system can substitute their work (cost-efficiently).
- This is a dirty, dull, dangerous and non-cost efficient task→perfect to be substtituted by a robot.
- The waste industry is targeting a challenging goal:

0 workers in Waste Treatment Plants

IF ROBOTS ARE GOING TO REPLACE WORKERS, THE FIRST ONES SHOULD BE HUMAN SORTERS, WHO ARE DOING A DIRTY, DULL AND DANGEROUS WORK.



2. Market need (II). Improving valuable material recovery rates

- Millions of tons of valuable materials (plastic, cans, cartons, etc) are buried or burned yearly.
- On average, only 20%* of world valuable materials present in waste are recycled or recovered.
- Why? → present practices don't allow to go further in a cost-effective way.

General Manager. Consortium for Municipal Solid Waste Treatment of Maresme.

"For us is very important to maximize recovery of materials and energy from waste in the concept of waste as a resource in a circular economy. We know there are some materials that could be recovered (as plastics, paper, cartons, etc.) that we are not being able to recover with the current plant configuration. For this reason, initiatives technologically so innovative as the one from Sadako Technologies have been very interesting for us from the beginning and for that reason we have helped them in order to test their prototypes in a real-scale waste plant as ours."

SADAKO TECHNOLOGIES

* *http://unstats.un.org/unsd/environment/wastetreatment.htm*

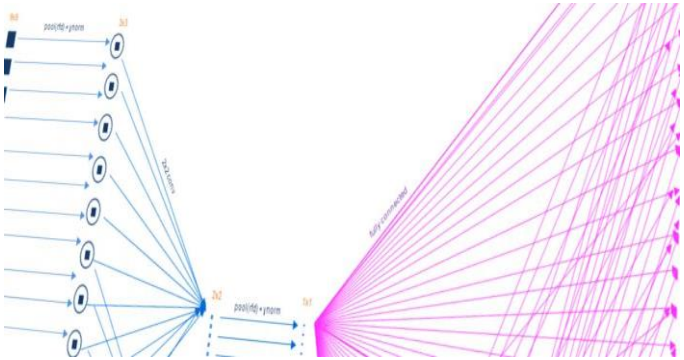
There are almost 40 countries that are landfilling all the waste recovered

3. Our key competence competitive advantage: artificial intelligence

- Actually, the waste industry sorting standard for material detection is based in expensive specific cameras/sensors.

- Sadako's detection (Artificial Intelligence based) costs a fraction due to:

i. We use state of the art multilayer convolutional neural networks (also known as *deep learning*) artificial intelligence techniques so our system can recognize valuable materials from a standard single visual (rgb) camera.



ii. In situ execution is done by very simple, nearly off-the shelf computer.

IBM softlayer computing farm

- Deep learning techniques need both a very high quantity of images (big data) and huge computing power to train models. Once the models have been trained, computer-systems to perform detection can be simple (and cheap).
- We train using cloud-based computing (soft-layer by IBM) with a proprietary database of millions of labeled images.
- At plant, our Wall-B only needs a cheap standard-performance PC

4. Our 1st disruptive product: Wall-B

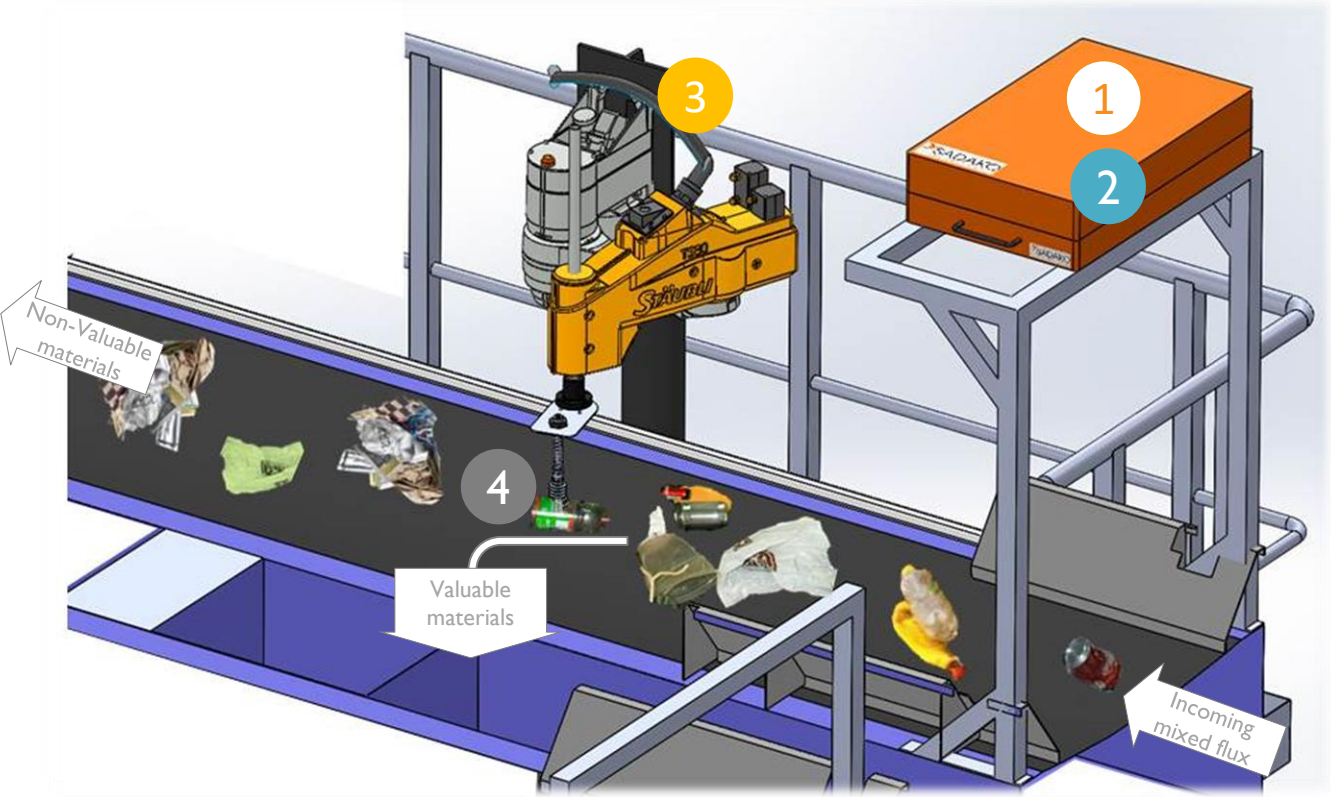
- Can sort valuable materials (plastics, cans and cartons) from urban waste streams with two main competitive advantages.
- Up to 1 Ton of recovery/day. Similar performance as a human sorter.

. low-cost: using artificial intelligence for material detection.

. non-intrusive & flexible (easy to install in an operating plant): using robotics for material collection

. continuous working, no social security, no work absences, not lack of motivation, etc.

Wall-B will be a game changer within the global waste industry.



1 **CAMERA BOX**
2D & 3D cameras
+ Illumination

2 **CONTROL SYSTEM: COMPUTER ARTIFICIAL INTELLIGENCE**
To make everything work (not seen in the diagram)

3 **ROBOT**

4 Grasping tool: **SUCKER**

Several Wall-B can be installed in each plant (up to tens Wall-B / plant)

Two usages

→ Substituting people ↙ Cutting costs

→ Recovering extra valuable materials ↗ Increasing revenues

Several Wall-B can be installed in each plant

DISRUPTION IN THE INDUSTRY

KEY PARTNERS

Waste recovery and recycling schemes management companies

Public and private bodies devoted to waste recovery and environment

Press / Media

Regulators – Bodies responsible of recycling and circular economy: Waste agencies, governments agencies, European agencies.

KEY ACTIVITIES

Research and development

Closing and maintenance of licenses

Sales (equipment without robotics)

KEY RESOURCES

Technical staff: Artificial intelligence and advanced robotics

Computers

GPU's: Graphical Processing Units

Skills and financial resources to search and negotiation with partners

VALUE PROPOSITION

. New incomes (new plants): Having our product in exclusivity allows them to win contests for new waste treatment plants or to redesign (retrofit) already constructed ones

. Sales increases (plants in operation) : Both for new sales of our equipment alone or in conjunction with their current equipment

Operation cost cuts: workers substitution:
. Lower operation cost
. Improve in production: no absenteeism

Increase of incomes: Material recovery improvement.

Savings:
. General plant efficiency improvement.
. Real time data allows better performance / forecast

Improve metrics: Better recovery rates (main KPI)

Savings coming from improves in efficiency.

CUSTOMER RELATIONSHIPS

. Continuous performance

. Maintenance

. Tradeshows, congresses, direct visits

CHANNELS

DIRECT:

. Personal visits

. Sectorial associations

. Tradeshows / congresses / technical semminars

. Magazines and specialized webs

CUSTOMER SEGMENTS

.Waste treatment plant equipment producers (Multinationals):

Waste treatment plant dealers / owners
. Europe: ~30 main operators managing ~1000 waste treatment plants.

. USA: 10 main operators

Waste recovery and recycling schemes management companies

COST STRUCTURE

Human resources: R+D

Human resources: Management

Materials & equipment R+D

General expenses

Legal expenses: financing and contracting

Installation and hardware maintenance subcontracting

INCOMES

Licensees (to be used with robotics). 10%

Equipment sales (no robotics). 60.0K – 100K | System updates: 5K – 10K

Maintenance (no robotics) → Monthly subscription: 500 ~ 1000 € / plant

Project sales~ 30K - 100K

7. Waste treatment plant operators: Customers & market

This is a worldwide market, with an expected accumulated market growth in the following years of 8%*

- ✓ In Europe & USA most of the plants are already constructed, but need to improve their performance or a complete retrofitting (updating equipment).
- ✓ In under development countries plants are still to be built (and equipment to be installed).

≈ 30 operators managing
≈1000 waste treatment plants

VEOLIA · SUEZ environnement · van Gansewinkel · FCC Environment · ferrovial · Shanks Making more from waste · ALBA · Biffa · REMONDIS · urbaser · Sacyr

Bigger operators

WM WASTE MANAGEMENT · REPUBLIC SERVICES · WASTE CONNECTIONS, INC. · Progressive Waste Solutions

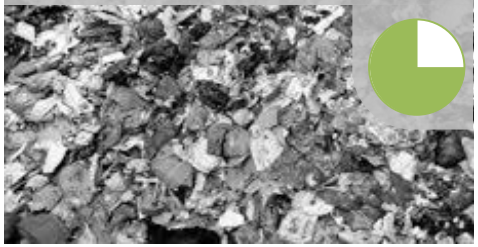
Directive 2008/98/CE

2020 50%

- Regulation trends will increase market needs in the near future
- According to this directive, by 2020, 50% of valuable materials in the European Union should be recuperated.

*Tomra investors report.

8. Competition

	SADAKO TECHNOLOGIES / AMPROBOTICS SCALABLE RECYCLING	ZENROBOTICS®
MARKET (size)	URBAN 	CONSTRUCTION
COST	Low	High

9. About SADAKO TECHNOLOGIES

- founded in July 2012
- 1.250K€ invested: founders (200.000€) + eit Knowledge & Innovation Community KIC InnoEnergy + private / public loans) + industrial partner
- Main goal: Increase recycling rates from urban waste in a cost efficient way through the use of robotics and artificial intelligence
- Team of 13 people working (mainly informatics & industrial engineers)
- founders

EUGENIO GARNICA
ceo and cto

- engineer
- formerly internationals project manager in Iberdrola (IBE:Soc.Bol SIBE) engineering
- formerly, project management university teacher

JAVIER DE LA OSSA
business dev

- engineer, eMBA (IESE)
- formerly CaixaCapital Risk VC,
- formerly founder of Business Booster accelerator

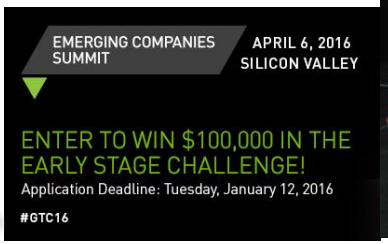
BELEN GARNICA
cfo and market

- business administration, master in finances
- formerly ceo of a family business in plastic sector
- formerly consultant (finance) of startup echosystem

10. Recent Awards & acknowledgements

ARTIFICIAL INTELLIGENCE

April 2016 **Winners in the Nvidia emerging companies contest within the GPU technology conference,** San Jose, California



ROBOTICS

Sep 2015. **Selected to present in San Jose Robobusiness startup pitchfire**

ROBO Business
INVEST ▸ INNOVATE ▸ IMPLEMENT
September 23-24, 2015
San Jose, CA
Robotics Powering Business Growth Worldwide

STARTUP PITCHFIRE

WASTE

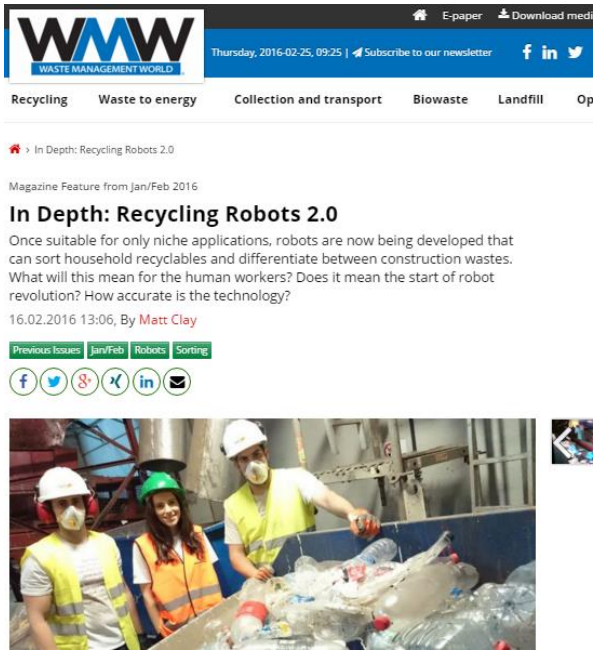
Oct 2015. **"R" Award to Best Innovation / Entrepreneurship project**

ENTREPRENEURSHIP

July 2015. **Award to Best Startup - Venture Networking Competition**

Jan 2016. **Global Robot Expo Best Robotics Startup**

11. Recent Press Room (International)


WMW WASTE MANAGEMENT WORLD

Thursday, 2016-02-25, 09:25 | Subscribe to our newsletter

Recycling | Waste to energy | Collection and transport | Biowaste | Landfill | Op

In Depth: Recycling Robots 2.0

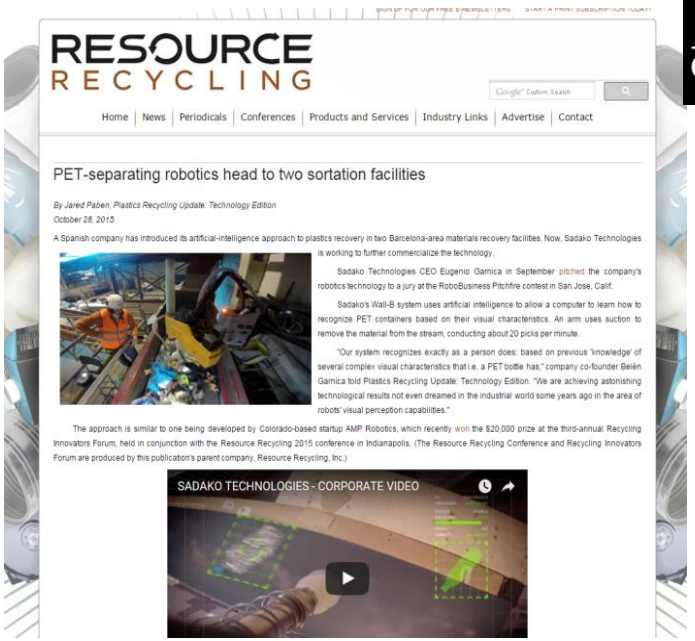
Magazine Feature from Jan/Feb 2016

In Depth: Recycling Robots 2.0

Once suitable for only niche applications, robots are now being developed that can sort household recyclables and differentiate between construction wastes. What will this mean for the human workers? Does it mean the start of robot revolution? How accurate is the technology?

16.02.2016 13:06, By Matt Clay

Previous Issues | Jan/Feb | Robots | Sorting


RESOURCE RECYCLING

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PET-separating robotics head to two sortation facilities

By Jared Paben, Plastics Recycling Update Technology Edition
October 28, 2015

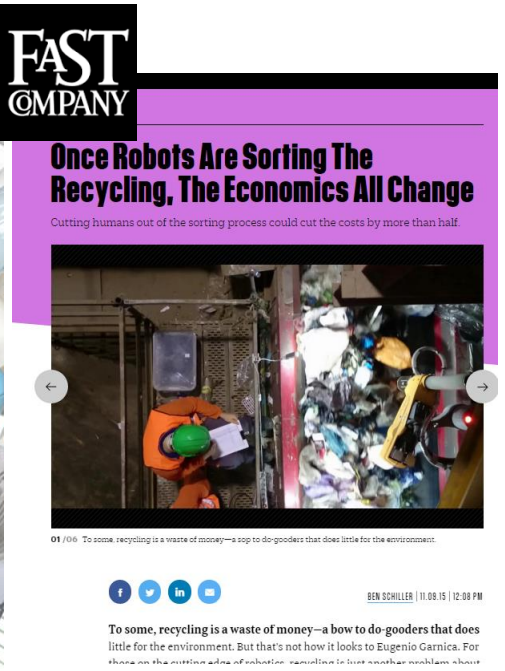
A Spanish company has introduced its artificial-intelligence approach to plastics recovery in two Barcelona-area materials recovery facilities. Now, Sadako Technologies is working to further commercialize the technology.

Sadako Technologies CEO Eugenio Garnica in September pitched the company's robotics technology to a jury at the RoboBusiness Pitchfire contest in San Jose, Calif.

Sadako's Wall-B system uses artificial intelligence to allow a computer to learn how to recognize PET containers based on their visual characteristics. An arm uses suction to remove the material from the stream, conducting about 20 picks per minute.

"Our system recognizes exactly as a person does: based on previous 'knowledge' of several complex visual characteristics that i.e. a PET bottle has," company co-founder Belén Garnica told Plastics Recycling Update Technology Edition. "We are achieving astonishing technological results not even dreamed in the industrial world some years ago in the area of robots' visual perception capabilities."

The approach is similar to one being developed by Colorado-based startup AMP Robotics, which recently won the $20,000 prize at the third-annual Recycling Innovators Forum, held in conjunction with the Resource Recycling 2015 conference in Indianapolis. (The Resource Recycling Conference and Recycling Innovators Forum are produced by this publication's parent company, Resource Recycling, Inc.)


FAST COMPANY

Once Robots Are Sorting The Recycling, The Economics All Change

Cutting humans out of the sorting process could cut the costs by more than half.

01 /06 To some, recycling is a waste of money—a sop to do-gooders that does little for the environment.

BEN SCHILLER | 11.08.15 | 12:08 PM

To some, recycling is a waste of money—a bow to do-gooders that does little for the environment. But that's not how it looks to Eugenio Garnica. For

FuturENVIRO

PROYECTOS, TECNOLOGÍA Y ACTUALIDAD MEDIOAMBIENTAL
PROJECTS, TECHNOLOGIES AND ENVIRONMENTAL NEWS

¿Sabías que en España reciclar se escribe con Y?

recyclia

GESTIÓN DE RESIDUOS | WASTE MANAGEMENT
VALORIZACIÓN ENERGÉTICA DE RESIDUOS | WASTE-TO-ENERGY
RECICLAJE | RECYCLING

LA ROBÓTICA QUE REVOLUCIONARÁ EL RECICLAJE DE RESIDUOS

ROBOTIC SORTING WILL BE THE NEXT GAMECHANGER IN WASTE RECYCLING

RECYCLING POINT

Home | Database | Notizie | Perché riciclare | Contatti

Articoli correlati

Scenari

Raccolta differenziata? Meglio affidarla a un robot

Sotto da: Redazione, 20 novembre 2015

Tag:

riciclo
economia circolare

Arrivano le macchine intelligenti in grado di selezionare i materiali: una soluzione che potrebbe rivoluzionare il settore.

rbr robotics business review

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Startup: Sadako Technologies

SADAKO TECHNOLOGIES

Background
SADAKO TECHNOLOGIES has developed a disruptive waste sorting device based on computer vision and advanced robotics. Designed to be installed in waste treatment plants (WTP) that process solid urban waste, it is able to recover up to 200 Tons of valuable material (such as plastic bottles, brics, cans...) per year, which equals 100.000 € per year, that this way are saved from landfill or burning.

Show/Hide

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Contact: Belén Garnica
http://www.sadako.es/

Company Leadership
Belén Garnica, Co-Founder and Business Developer

Market Segments
Energy · Industrial · Manipulator

Sadako Technologies in the News

More about Sadako Technologies from Robotics Business Review
More on Sadako Technologies

Wall-B
WALL-B consists on a high-speed industrial

RBR50 Com
RBR
3D Robotics
Aethon
Autonomous
Bosch Grou
Caterpillar, I
Dyson
The RBR50
Browse RBR
Airborne
Engineering
Industrial
Maritime
Mobile

SADAKO TECHNOLOGIES

12. Recent Press Room (Spain)

INVERSIÓN finanzas.com

SADAKO

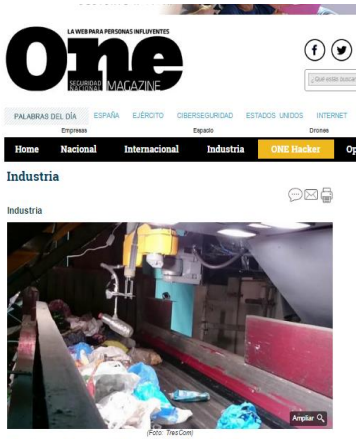
Un robot «que ve» y separa la basura valiosa

Un inicio en la industria nuclear

SABEMOS DIGITAL

Robots españoles que trabajan para gigantes del Ibex

La robótica es una industria que mueve en estos momentos más de 20.000 millones de euros en todo el mundo. Se espera que en 2020 esa cifra alcance los 80.000 millones. Muchos ceros aseguran una buena salud para un sector que salpicará a todos los demás. Un ejemplo es la *startup* Sadako, que ha creado un robot llamado Wall-B al que no le importa mancharse las manos de basura.


One MAGAZINE

Industria

Este robot sabe reciclar la basura con sólo mirarla

Una empresa española logra crear la primera máquina capaz de reconocer y recoger plásticos, latas y briks entre los residuos urbanos para su posterior reciclaje

ara.cat emprenem

Belén Garnica:"El robot serà una eina de productivitat per al treballador, igual que l'ordinador"

Cofundadora de Sadako Technologies, empresa de robòtica

EL PAÍS TECNOLOGÍA

Seis aplicaciones robóticas que no conocías

Los robots desconocidos van desde esqueletos metálicos hasta lanchas que se mueven solas

Quo LAS 101 MENTES INNOVADORAS DE ESPAÑA

Curiosidades ■ Noticias ■ Tendencias ■ Fotoimpactos ■ Consultas

trabajado con actores de la talla de Lewis MacDougall, Felicity Jones y Liam Neeson en su última película: Un monstruo viene a verme. En 2017 trabajará con Brad Pitt en la segunda parte de Guerra Mundial Z.

14 Doctor Joaquim Valls, matemáticas para todos

No solo es uno de los profesores de matemáticas más prestigiosos de nuestro país, también destaca como entrenador de inteligencia emocional a través del método grafotransformador. Recientemente ha publicado el libro Genial Mente, una obra polémica y revolucionaria donde defiende que cualquiera que se lo proponga es capaz de aprender matemáticas.

15 Teresa Fdez. Valdés, una de las mejores showrunners de europa

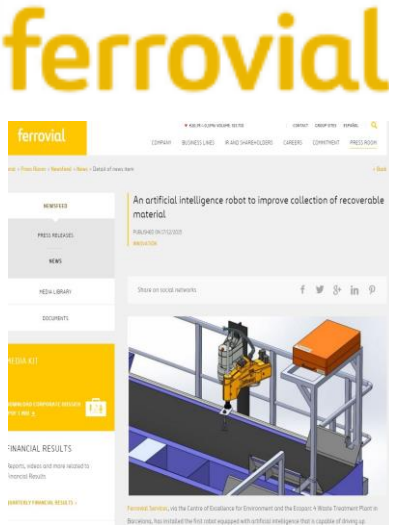
Elegida una de las cinco showrunners (una especie de productora ejecutiva) mejores de Europa, esta joven gallega formó junto con su marido, Ramón Campos, la productora Bambú. Ha dejado su marca personal en trabajos como Hispania, Velvet, Refugiados, Gran Hotel y Gran Reserva.

16 Eugenio Garnica, hacer más eficaz el reciclaje

Garnica comenzó trabajando en el departamento de generación nuclear de Iberdrola, hasta que un día, tras haber viajado por medio mundo, apostó por dar un giro radical a su carrera. Fundó Sadako, empresa que ha visto nacer a Wall-B, un robot que hace más eficaz el reciclaje gracias a que recupera los miles de artículos con valor que día tras día se pierden en las cintas de las plantas de tratamiento.

17 Ana Bru, la primera mujer española que viajará al espacio

La agencia de Ana Bru no solo ofrece experiencias exclusivas, sino que muy pronto podría organizarte un viaje más allá de la estratosfera. Ella será la primera mujer española que viajará al espacio gracias a Virgin Galactic. Se define a sí misma como inquieta, curiosa, emprendedora e innovadora.


ferrovial

An artificial intelligence robot to improve collection of recoverable material

BAQUÍA

Sadako Tech: "La IA se utiliza pero no de manera eficiente"

Wall-B es un robot que separa residuos de manera eficiente. Sus creadores, la startup catalana Sadako Tech., ha utilizado la inteligencia artificial para crear un robot que realice esta función dentro de la economía circular. Una tarea que acaba siendo pesada para el ser humano y para que la robótica ha demostrado su utilidad.

En una conversación mantenida por Baquía con uno de sus socios fundadores, Javier de la Ossa, la startup cuenta cómo nació la idea para crear Wall-B, el uso de la inteligencia artificial en el campo de la robótica y el future que le espera a la empresa, días después de salir galardonada de la primera edición de la Global Robot Expo que se celebró en Madrid.

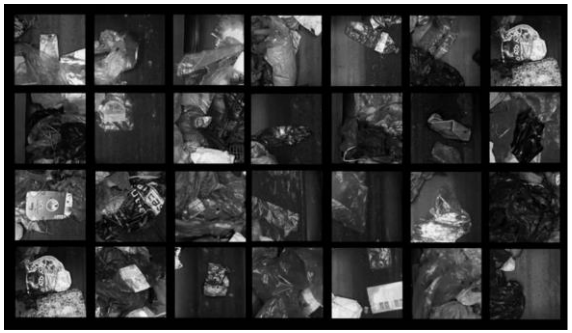
13. Development strategy

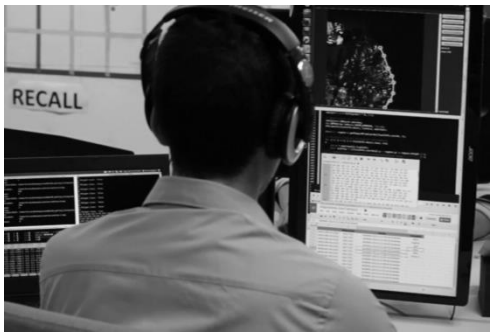
License agreement

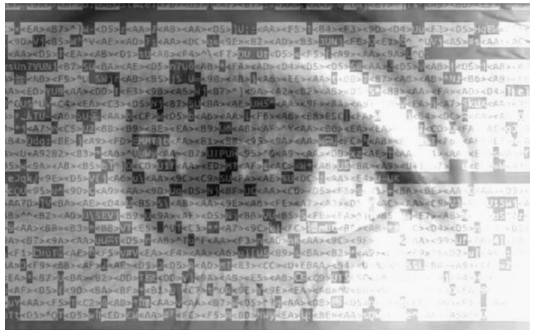
Under negotiation with one of the most relevant players worldwide in the waste industry.

New products pipeline

- New products to be developed, mostly under licensee agreement (adding additional incomes).
- Some examples
  - Online plant monitoring system
  - Recovered materials bales tracking system
  - Characterization system
  - Bulky sorter.







We are adding to robots the ability to understand the environment and take decisions.

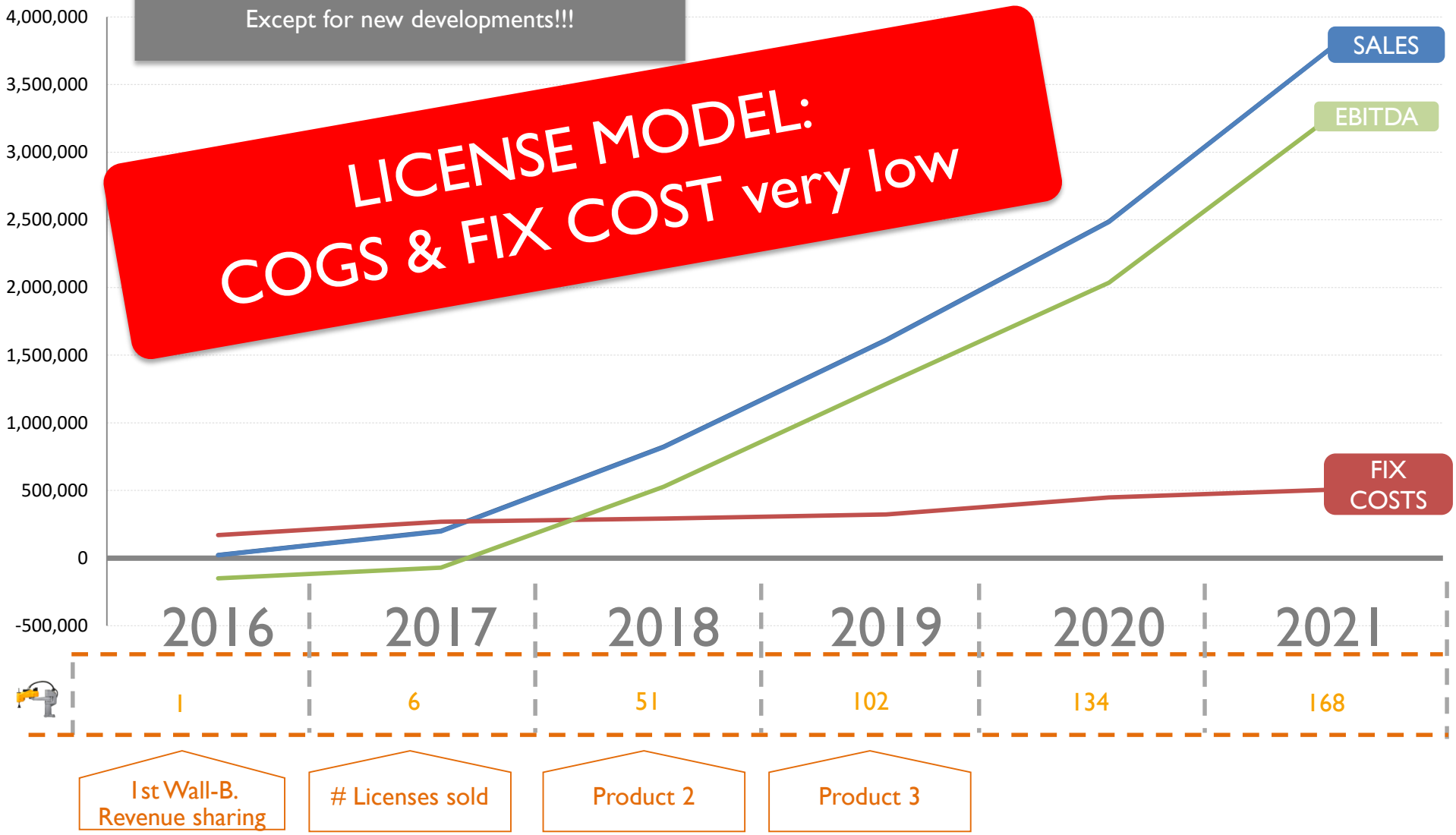
Technology can be used in hundreds of applications:

- In the same field: waste.
- Other fields

14. Financials

NO FURTHER FINANCIAL ROUND NEEDED:
Except for new developments!!!

LICENSE MODEL:
COGS & FIX COST very low



15. Investment round

- Amount and company value to be adjusted.
  - Amount: 500.000€.
  - Premoney: 3.500.000€

- To be used in:
  - Improve performance Wall-B
  - Development of new products within the waste sector

16. Final statements regarding current financial round

1. Waste treatment is and mandatory expense for any household.
2. Waste is a growing market.
3. We have a disruptive technology for this market (which will quickly become a standard).
4. Teaming with one of the global market leaders we are unleashing and impressive market potential.
5. With the necessary funding can have fast & explosive growth.

I.VISION

Given the customer reactions we envision a massive substitution of manual sorters by robots.
Being convinced that this will happen, it implies several things:

1. Soon all plants will have not one but several robots, and robots will be a standard in waste treatment plants as other equipment is now.

2. Sadako has the knowledge and the product to make it happen.

3. Others may develop that technology. The most immediate might be thinking in the current manufacturers of equipment for waste treatment plants, but they are unlikely, because their skills are another: they master more traditional technologies: hardware, service, maintenance, etc.

4. Our license agreement allows a fast commercial worldwide deployment.

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www.sadako.es

More videos: www.sadako.es & https://www.youtube.com/user/sadakotechnologies