

Final Workshop KBSWeld

Knowledge-based System for
Welded Structures and
Technologies
Project Ref.: COFUND-MANUNET
III - KBS-Weld

November 28th 2019



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01- Introduction

- Workshop Agenda



Workshop Agenda

Thursday, 28th November 2019, starting on 09⁰⁰, local time

KBSWELD WORKSHOP

Contents

9:00h Registration of participants
Welcome Breakfast

9:30h KBSWeld Project Presentation

9:45h Prediction of imperfections and mechanical properties in the GMAW process
Authors: Alin Constantin Murariu; Aurel Valentin Birdeanu; Radu Ovidiu Zaporojan

10:15h KBSWeld Software platform presentation

10:30h Design Thinking: Warm-up: The bridge over Kwai River

11:00h Design Thinking: Customer Value Map

12:00h End of the Workshop.

02 – Project Presentation

- Prediction of imperfections and mechanical properties in the GMAW process.



KBSWeld: Knowledge-based System for Welded Structures and Technologies

Project abstract

Welding is an essential manufacturing process performed in almost every major industry. Therefore, weld quality and integrity are critical to safety in an extensive range of products and structures.

The KBS-Weld project aims to develop a knowledge-based system functioning as a computational support for the planning of the welding process, allowing the end-users to choose the best combination of welding materials, welding technologies and welding parameters to produce a welded structure with the required properties.

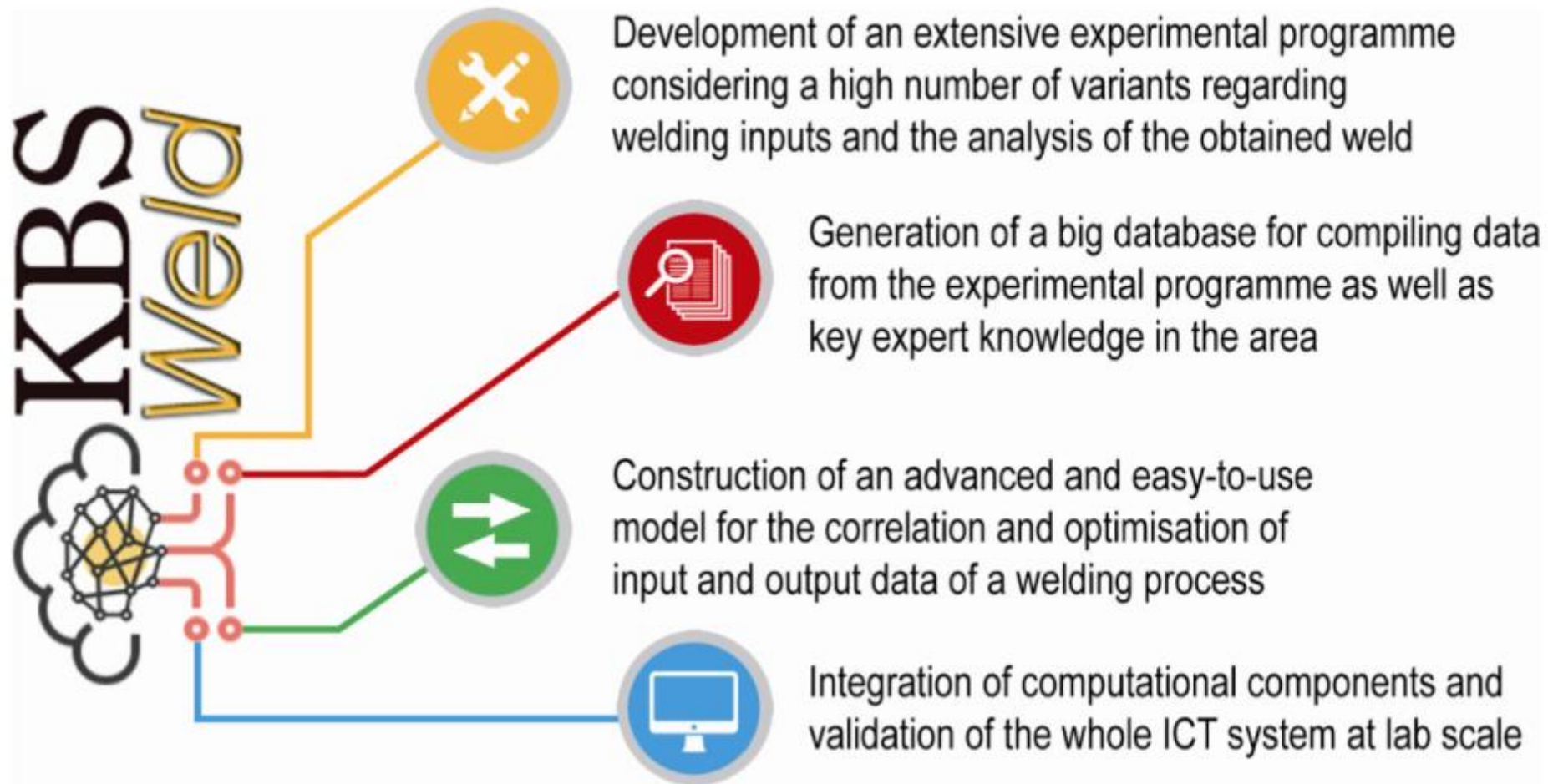
Being designed to reduce the lead-time and the direct influence of the human factor in the welding processes, as well as to increase the credibility of the results, this system will address some of the main needs of the SMEs involved in the manufacturing activities specific for the domain of interest that are highly demanding and with long term significant consequences on product's quality and safety.



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No. COFUND-MANUNET III - KBS-Weld

KBSWeld: Knowledge-based System for Welded Structures and Technologies



KBSWeld: Knowledge-based System for Welded Structures and Technologies



KBSWeld: Knowledge-based System for Welded Structures and Technologies

The screenshot displays the KBSWeld web application interface, which is divided into several sections:

- Navigation Menu (Left):** A vertical sidebar with options: Welcome, Materials, WPS Design, WPS Test, Experiments, WPS, and Log out.
- KBS - WELD Overview (Top Left):** A central graphic with the text 'KBS Weld' and three main points:
 - Development of an extensive knowledge base considering a high number of welding inputs and the analysis of their effects.
 - Generation of a WPS from the expert knowledge of key expert knowledge.
 - Construction of an advanced model for the correlation and analysis of input and output data of a welding process.
- WPS Test Results (Top Right):** A table showing the results of various welding tests.

Name Test	Type Process	Type Position	Base Material 1	Base Material 2	Filler Material	Gas	Actions
test101	GTAW	PA - Flat	P420M	P420M			
test4	GTAW	PA - Flat	S235JR	S235JR	G3Si1	M21 ArC 20	
test2	GMAW	PB - Horizontal	S235JR	S235JR	G3Si1	M21 ArC 20	
test5	GTAW	PA - Flat	S235JR	S235JR	G3Si1	M21 ArC 20	
test5	GTAW	PA - Flat	S235JR	S235JR	G3Si1	M21 ArC 20	
- Experiments (Bottom):** A section for searching and viewing experimental data.

Search criteria: Name Thickness

Name	Base Material 1	Base Material 2	Thickness	Joint Type	Actions
testExperiment4	S235JR	S235JR	2	Buttweld	
test01	P420M	P420M	8	Filletweld	
testExperiment1	P460M	P420ML2	2	Filletweld	
testExperiment2	P460M	P420ML2	4	Filletweld	
testExperiment3	P460M	P420ML2	2	Filletweld	
test103	P420M	P420M	4	Buttweld	

03 – Paper Presentation

- KBSWeld Project



04 – Software Platform Presentation

- KBSWeld Project



KBSWeld: Knowledge-based System for Welded Structures and Technologies

The screenshot displays the KBSWeld web application interface, which is divided into several sections:

- Navigation Menu (Left):** A dark sidebar with icons and text for 'Welcome', 'Materials', 'WPS Design', 'WPS Test', 'Experiments', 'WPS', and 'Log out'.
- KBS - WELD Overview (Top Left):** A central graphic with the text 'KBS Weld' and three circular icons. The first icon (wrench and screwdriver) is labeled 'Development of an extensive... considering a high number... welding inputs and the ana...'. The second icon (document with magnifying glass) is labeled 'Generation of... from the exper... key expert kn...'. The third icon (gears) is labeled 'Construction of an advance... model for the correlation a... input and output data of a...'.
- WPS Test Results (Top Right):** A table titled 'WPS Test Results' with a '+ New Test' button. The table lists test results with columns for Name, Type Process, Type Position, Base Material 1, Base Material 2, Filler Material, Gas, and Actions.

Name Test	Type Process	Type Position	Base Material 1	Base Material 2	Filler Material	Gas	Actions
test101	GTAW	PA - Flat	P420M	P420M			
test4	GTAW	PA - Flat	S235JR	S235JR	G3Si1	M21 ArC 20	
test2	GMAW	PB - Horizontal	S235JR	S235JR	G3Si1	M21 ArC 20	
test5	GTAW	PA - Flat	S235JR	S235JR	G3Si1	M21 ArC 20	
test5	GTAW	PA - Flat	S235JR	S235JR	G3Si1	M21 ArC 20	
- Experiments (Bottom):** A section titled 'Experiments' with search criteria (Name, Thickness) and a 'Results' table. The table lists experiment results with columns for Name, Base Material 1, Base Material 2, Thickness, Joint Type, and Actions.

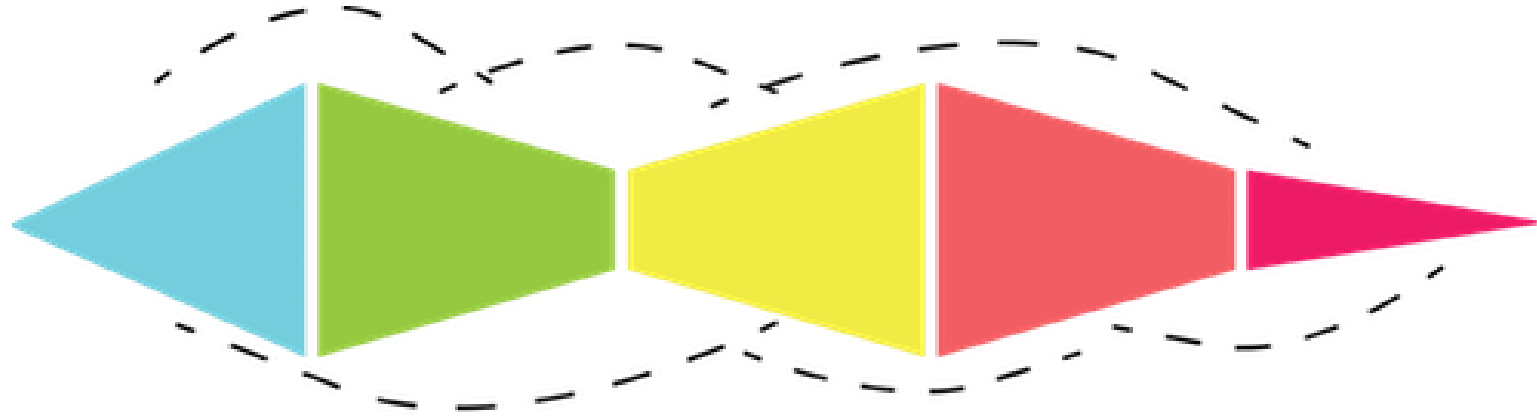
Name	Base Material 1	Base Material 2	Thickness	Joint Type	Actions
testExperiment4	S235JR	S235JR	2	Buttweld	
test01	P420M	P420M	8	Filletweld	
testExperiment1	P460M	P420ML2	2	Filletweld	
testExperiment2	P460M	P420ML2	4	Filletweld	
testExperiment3	P460M	P420ML2	2	Filletweld	
test103	P420M	P420M	4	Buttweld	

05- Design Thinking

- Introduction
- Warm-up
- Customer Value Map



Design Thinking - ¿How?



It is applied in sessions in which one looks for:

- Diverge - converge
- Wrong fast and cheap.
- Ask questions not asked
- Method for creativity (order chaos).
- Pragmatic in the background.

EMPATHIZE

Design Thinking process begins with the understanding of the needs of the users and their environment to be able to generate solutions consistent with their realities.

DEFINE

During Definition stage, we must keep what really adds value. We will identify problems whose solutions will be key to obtaining an innovative result.

IDEA

It aims to generate options. In this phase, activities favor expansive thinking and we must eliminate value judgments.

PROTOTYPE

We return ideas to reality. Building prototypes makes ideas palpable and helps us visualize possible solutions, revealing elements that we must improve or refine before reaching the final result.

TEST

We will test our prototypes with users. This phase will help us identify improvements, failures and possible shortcomings. During this phase we will evolve our idea until it becomes the solution we were looking for.

05.1 - Warm- Up

- Bridge over Kwai River



Warm up : “Bridge Over Kwai River”

Rapid prototyping.

How to play?

We make two or three teams, each team has two chairs, a tennis ball, a newspaper and duct tape.

THE CHALLENGE

Build a bridge between the two chairs using the materials and through which you can cross the ball in a limited time.

WHO WINS?

The team that manages to make the longest bridge and support that the ball crosses from one side to the other wins.

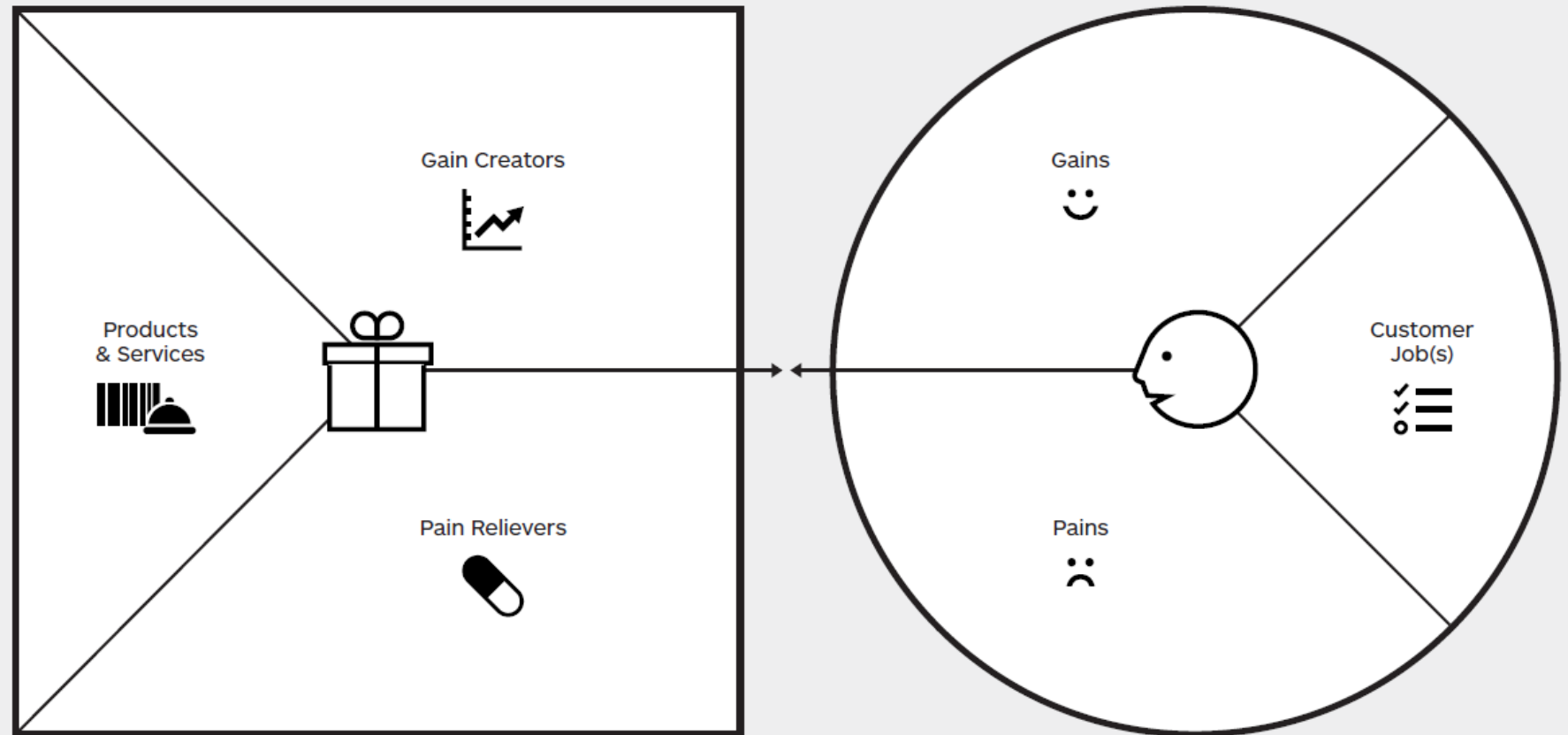
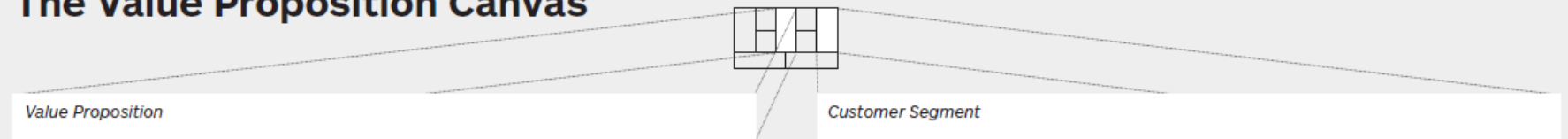
05.2- Customer Value Map

- User expectations.
- Product Value



Customer Value Map- Instructions

The Value Proposition Canvas



Value Map- Instructions

1. **Customer Jobs** or usual or daily activities: activities related to your product / service that your customers are trying to perform regularly.

2. **Gains (benefits):** benefits that your clients expect to obtain when performing these activities:

- What savings makes your customer happy?: in terms of time, money and effort, ...;
- What results and expectations does your client expect?: in terms of quality level, more than something, less than something,....;
- How do you excite the current solutions to your client?: characteristics, performance, quality,....;
- What could make your client's work or life easier?: a flatter learning curve, more services, lower cost of ownership,....;
- What are customers looking for?: a good design, guarantees, specific features,....;
- How would you measure the success and failure of your client and failure?: in terms of performance, cost,
- What would increase the likelihood of adopting a solution?: lower cost, less investment, less risk, better quality, performance, design,...

3. **Pains**

- What makes an activity tedious and demands an effort from your client?
- What makes you feel bad when using the solutions that are already on the market?
- What are the main difficulties and risks that your client finds when using the solutions that already exist in the market?
- What negative social consequences does your client fear?
- What risks scare you the most?
- What mistakes do you usually make repetitively when using it?
- What barriers keep you from adopting such solutions?

Value Map- Instructions

1.Products and services: products or services that you offer to your customers to help them with the activities listed

2.Gain creators (vitamins): How are you providing benefits to your customers based on the expectations of your clients mentioned above.

- Save "costs" that make you happier
- Do your products copy or reproduce solutions that already exist and that your client likes?
- Do your products make life easier for your client?
- Do your products cause social consequences that your client wants?
- Do your products do something your customers were looking for?
- Are your products designed to help make adoption easier?

3.Pain Relievers: Describe how your products and services "relieve" your customer. You should think about how your products eliminate or reduce the negative emotions that your client experiences when performing a certain activity, as well as the costs, risks and unwanted situations that your customers may suffer when performing the activity or activities for which you have conceived your product. Ask yourself if your products:

- Do they put an end to difficulties and challenges that your client usually encounters when performing an activity?
- Do your products drive negative social consequences that your client suffers or fears?
- Do you eliminate risks that your client fears?

Mapa de valor - Instrucciones

1. Customer Jobs o actividades habituales o diarias: actividades relacionadas con tu producto/servicio que están intentando realizar tus clientes habitualmente.

2. Gains (beneficios): beneficios que esperan obtener tus clientes al realizar esas actividades:

- ¿qué ahorros hace feliz a tu cliente?: en términos de tiempo, dinero y esfuerzo, ...;
- ¿qué resultados y expectativas espera tu cliente?: en términos de nivel de calidad, más de algo, menos de algo, ...;
- ¿cómo entusiasman las soluciones actuales a tu cliente?: características, rendimiento, calidad, ...;
- ¿qué podría hacer el trabajo de tu cliente o la vida más fácil?: un curva de aprendizaje más plana, más servicios, menor costo de propiedad, ...;
- ¿qué buscan los clientes?: un buen diseño, garantías, las características específicas, ...;
- ¿cómo medirías el éxito y el fracaso de tu cliente y el fracaso?: en términos de rendimiento, coste, ...;
- ¿qué aumentaría la probabilidad de adoptar una solución?: coste más bajo, menos inversiones, menos riesgo, mejor calidad, rendimiento, diseño, ...

3. Pains

- ¿Qué es lo que hace que una actividad le resulte tediosa y le exige un esfuerzo a tu cliente?
- ¿Qué es lo que le hace sentir mal al utilizar las soluciones que ya hay en el mercado?
- ¿Cuáles son las principales dificultades y riesgos que se encuentra tu cliente al usar las soluciones que ya existen en el mercado?
- ¿Qué consecuencias sociales negativas tu cliente teme?
- ¿Qué riesgos le asustan más?
- ¿Qué errores suele cometer repetitivamente al utilizarlo?
- ¿Qué barreras le mantienen alejado de adoptar dichas soluciones?

Mapa de valor - Instrucciones

1.Products and services (productos y servicios): productos o servicios que ofreces a tus clientes para ayudarlos con las actividades reseñadas

2.Gain creators (vitaminas): Cómo estás aportando beneficios a tus clientes en base a las expectativas de tus clientes antes mencionadas.

- **Ahorrar “costes” que le hacen estar más contento**
- **¿Tus productos copian o reproducen soluciones que ya existen actualmente y que le gustan a tu cliente?**
- **¿Tus productos le hacen la vida más fácil a tu cliente?**
- **¿Tus productos provocan consecuencias sociales que tu cliente desea?**
- **¿Tus productos hacen algo que tus clientes estaban buscando?**
- **¿Tus productos están pensados para ayudar a hacer una adopción más fácil?**

3.Pain Relievers: Describe como tus productos y servicios “alivian” a tu cliente. Deberás pensar en cómo tus productos eliminan o reducen las emociones negativas que tu cliente experimenta al realizar una determinada actividad, así como los costes, riesgos y situaciones indeseadas que tus clientes pueden sufrir al realizar la actividad o actividades para las que has concebido tu producto. Pregúntate si tus productos:

- **¿Ponen fin a dificultades y retos que tu cliente suele encontrarse al realizar una actividad?**
- **¿Tus productos alejan consecuencias sociales negativas que tu cliente sufre o teme?**
- **¿Eliminas riesgos que tu cliente teme?**

TED

Thank You! ;)

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