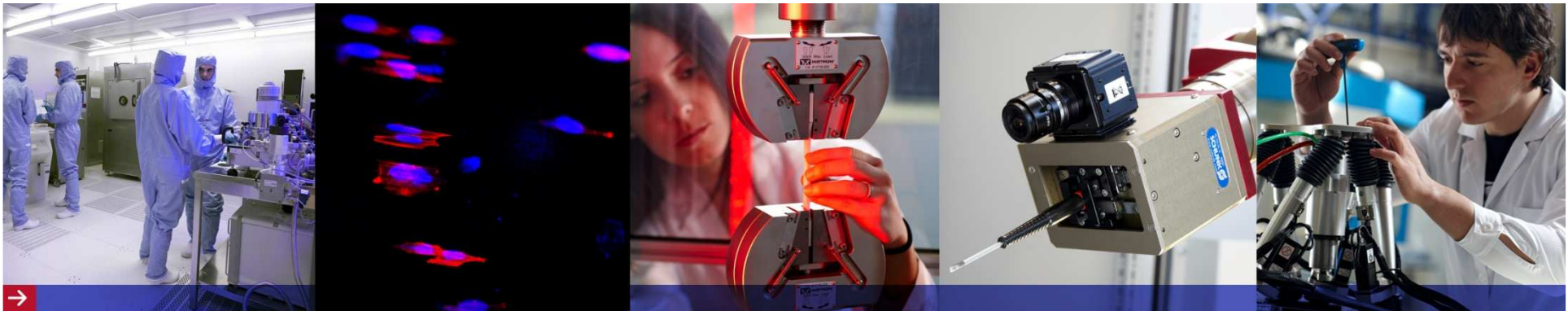


## **NANOPIGMY**

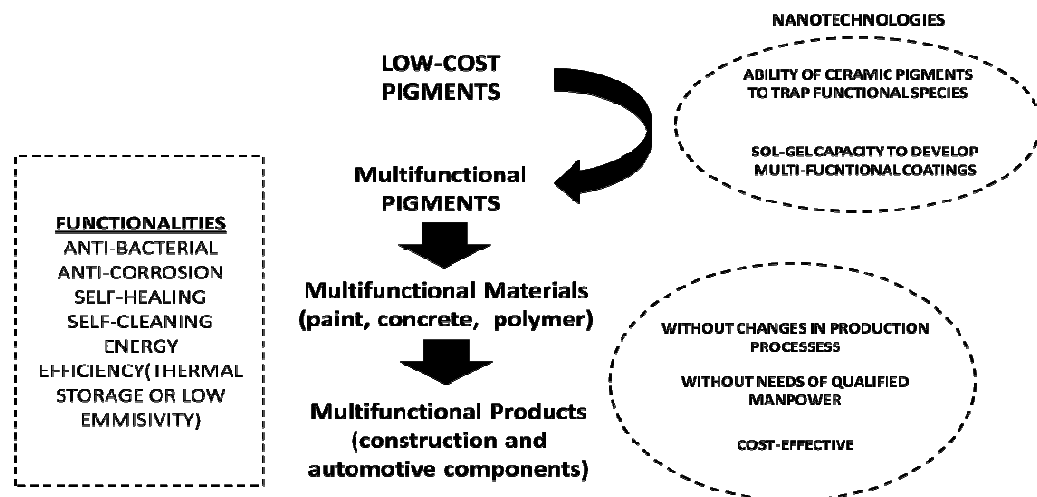
More than color: Applying nanotechnologies for the multifunctional ceramic pigments development.



# NANOPIGMY- Gestación de la idea



- Núcleo del consorcio:  
NUBIOLA y TEKNIKER
- Definiendo la idea desde Junio 2010 (con el draft de NMP):  
nueva generación de pigmentos que compitan con los HPP (high performance pigments)





# NANOPIGMY- Primeros obstáculos

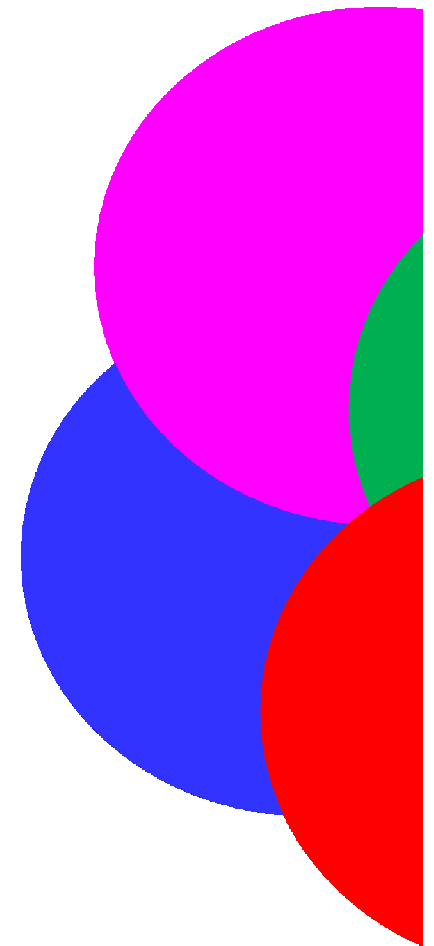
- Primeros obstáculos

¿El topic es el adecuado? : NMP-2011-2-1-1 Research and innovation for advanced ceramic materials with more added value

- Selection of one (or a limited number of) advanced ceramic material(s) that have the potential to add value to SMEs' products and sustainability to their industrial processes;
- Development of advanced added value ceramic materials that offer increased/simultaneous functionalities,
- Research activities in order to appropriately modify and adapt the advanced ceramic materials selected in order to allow their introduction into a future, potentially new production process.

Consultas con el officer: sin resultados concluyentes

Lección aprendida: Si la idea se ajusta al topic, a pesar de no ser la aplicación más obvia, hay posibilidades.





# NANOPIGMY- Definición de la idea

- Definición de la idea y definición del perfil de socio necesario

	MODIFICATIONS		SECTOR	MATERIAL	OBJECTIVE
	Sol-gel coating	NP embedding			
PIGMENT 1	Antibacterial (with Ag <sup>+</sup> )	PCM (energy)	CONSTRUCTION	PAINT & PLASTIC (interior)	ENERGY EFFICIENCY & POPULATION HEALTH
PIGMENT 2	IR high reflection (with ITO/AZO NP)		AUTOMOTIVE	PAINT (exterior)	ENERGY EFFICIENCY & LENGTH MATERIALS LIFETIME
	Anticorrosion (hybrid: Silica/organic)				
PIGMENT 3	Self-cleaning (TiO <sub>2</sub> )	PCM (energy)	CONSTRUCTION	CONCRETE (exterior)	ENERGY EFFICIENCY & REDUCTION OF HAZARDOUS PRODUCTS USE
PIGMENT 4	Self-healing (epoxy + curing agent)	Ag (antibacterial)	AUTOMOTIVE	PLASTIC (interior)	POP. HEALTH & LENGTH MATERIALS LIFETIME

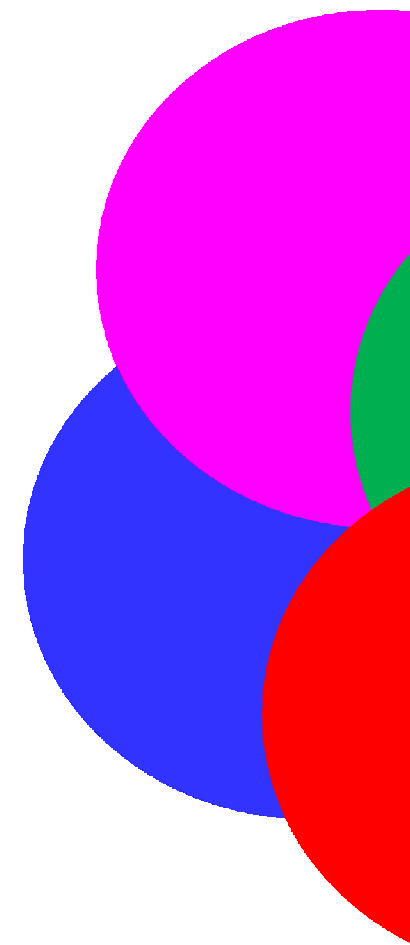
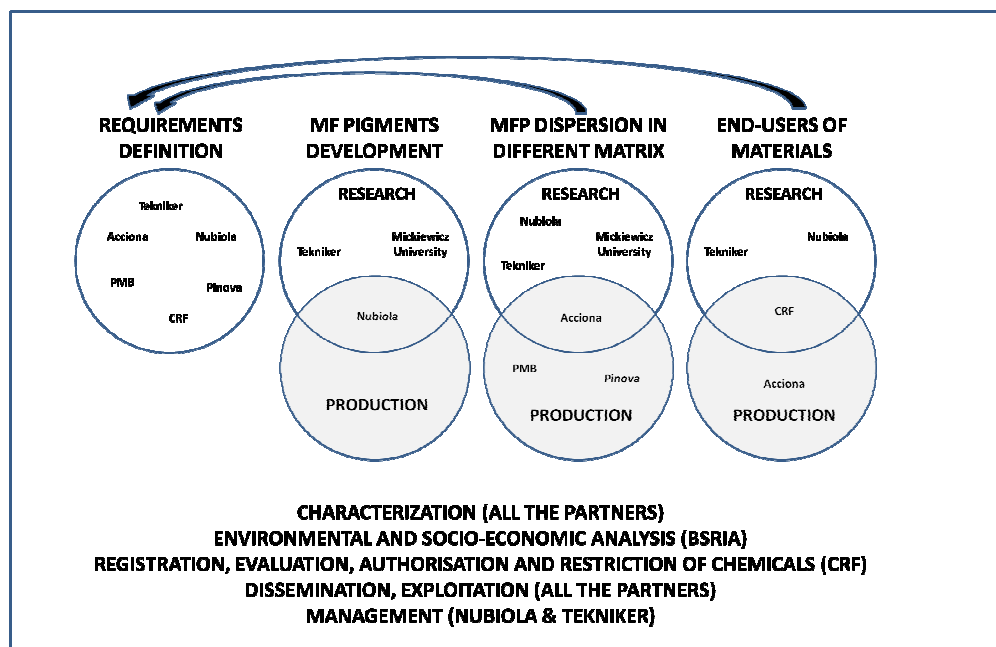
- Socios necesarios: Pinturas, cemento y Polímeros (que introduzcan los nuevos pigmentos), End-users (construcción y automoción), LCA, Caracterizador.





# NANOPIGMY- Búsqueda de socios

- Búsqueda de socios:
  - Clientes de NUBIOLA (PMB, PINOVA)
  - Socios habituales de TEKNIKER (CRF, ACCIONA)
  - Colaboradores de NUBIOLA (Mickiewicz University)
  - Herramienta CORDIS (BSRIA)





# NANOPIGMY- Redacción de la 1ª FASE

- Desde SEPTIEMBRE hasta NOVIEMBRE — Redacción entre NUBIOLA y TEKNIKER  
**ESR 1ªFASE**

1. **Scientific and/or technological excellence (relevant to the topics addressed by the call)**  
However, while the materials to be used are defined, the technique to incorporate nanoparticles in the porous structure should have been better detailed.
3. **Potential impact through the development, dissemination and use of project results**  
SIN COMENTARIOS NEGATIVOS

## Overall remarks

The authors should describe the materials' chemistry applied for the intended functions and the performances obtained in more details.



# ESR 2ª FASE – Nuestros puntos fuertes

- Todos aportaron en la redacción pero sólo TEKNIKER y NUBIOLA redactaron **ESR 1ª FASE**

## 1. Scientific and/or technological excellence (relevant to the topics addressed by the call) : 4.5/5

Technology	Functionality	¿Is there any pigment in the market with this functionality?	If yes, at which cost?	Any other weaknesses?	NANOPIGMY
REFERENCE: CERAMIC Ultramarine Pigments- 2-4€/Kg					
corporation of molecules/NP in porous matrix	PCM (Thermal Storage)	NO	-	-	New functionality
	Anti-bacterial	NO	-	-	New functionality
Coatings	Anti-bacterial	NO	-	-	New functionality
	Infrared high reflection	YES (Cool pigments- CACP)	40 €/Kg	Price	Price will be reduced and this functionality will be combined with others
	Self-cleaning	YES (TiO <sub>2</sub> -based)	20 €/Kg	Colorless (white)	Colored pigments and this functionality will be combined with others
	Anticorrosion	YES	4 €/Kg	Compatibility with organic compounds	Improvement in compatibility with organic compounds. This functionality will be combined with others.
	Self-healing	NO	-	-	New functionality

- Scientific route which has been chosen is promising and is based on an extensive literature review (ERA UNA DEBILIDAD DEL ESR DE LA 1ª FASE)

**SE PRESENTÓ LA TECNOLOGIA A EMPLEAR DEFINIDA AL DETALLE Y SE DETALLÓ EL “PROOF OF PRINCIPLE”- Experiencias previas de pigmentos recubiertos por sol-gel**

- A real progress beyond the state-of-the-art can be expected.

Explicación detallada del estado del arte, carencias actuales y cómo las superamos.



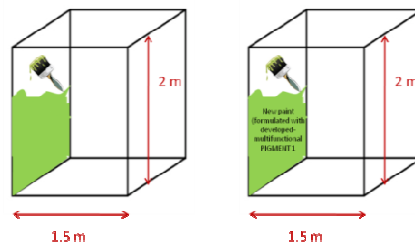
# ESR 2ª FASE – Nuestros puntos fuertes

## 1. Scientific and/or technological excellence

(relevant to the topics addressed by the call) : 4.5/5

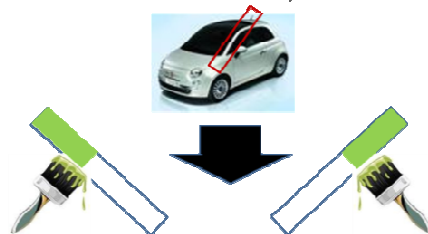
- The RTD planning is clearly detailed and realistic, it includes test on prototypes (**demonstrators**)

**DEMONSTRATOR 1: INTERIOR PAINT (ANTI-BACTERIAL AND THERMAL STORAGE)**



Interior paint based on UN-MODIFIED pigment  
Interior paint based on CONCRETE pigment formulated with multi-functional pigment

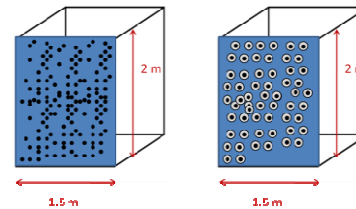
**DEMONSTRATOR 4: EXTERIOR PAINT (ANTI-CORROSION AND LOW EMISSIVITY)**



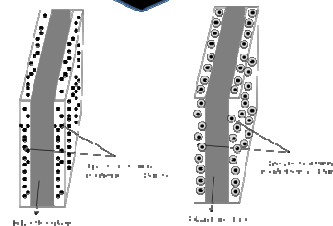
**REFERENCE COMPONENT**  
Paint formulated with the Un-modified pigment

**TESTING COMPONENT**  
New paint formulated with the multi-functional pigment 2

**DEMONSTRATOR 2: INTERIOR POLYMER (ANTI-BACTERIAL AND THERMAL STORAGE)**



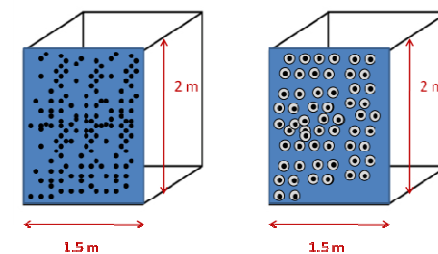
Interior polymer based on UN-MODIFIED pigment  
Interior polymer based on CONCRETE pigment formulated with multi-functional pigment



Reference component

Testing component

**DEMONSTRATOR 3: EXTERIOR CONCRETE (SELF-CLEANING AND THERMAL STORAGE)**



Exterior concrete based on UN-MODIFIED pigment  
Exterior concrete based on CONCRETE pigment formulated with multi-functional pigment

Exterior concrete based on CONCRETE pigment formulated with multi-functional pigment

**DEMONSTRATOR 5: INTERIOR POLYMER (ANTI-BACTERIAL AND SELF-HEALING ABILITY)**



**REFERENCE COMPONENT**  
Un-modified pigment embedded in the polymer matrix



**TESTING COMPONENT**  
Multi-functional pigment 4 embedded in the polymer matrix





## ESR 2ª FASE – Nuestros puntos fuertes

### 2. Quality and efficiency of the implementation and the management : 4.3/5

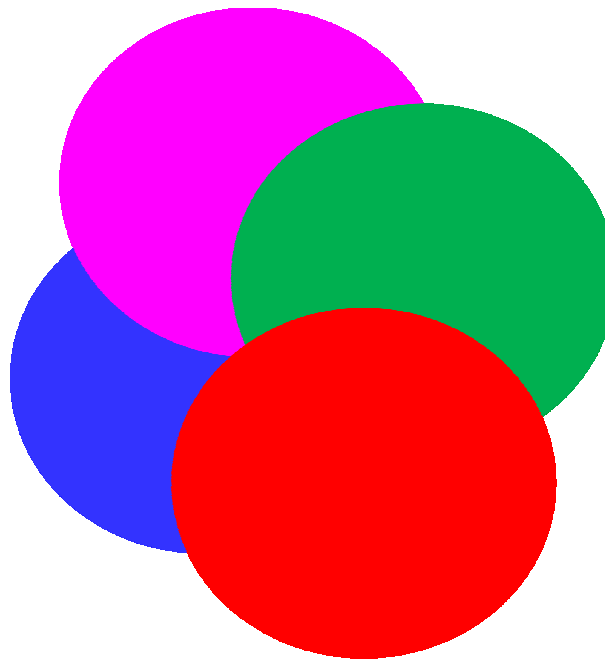
- The consortium is of high quality and good commitment between partners is described
- A special procedure is proposed for conflict resolution at the lowest level possible

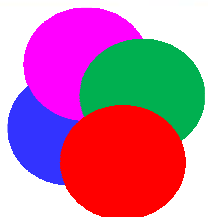
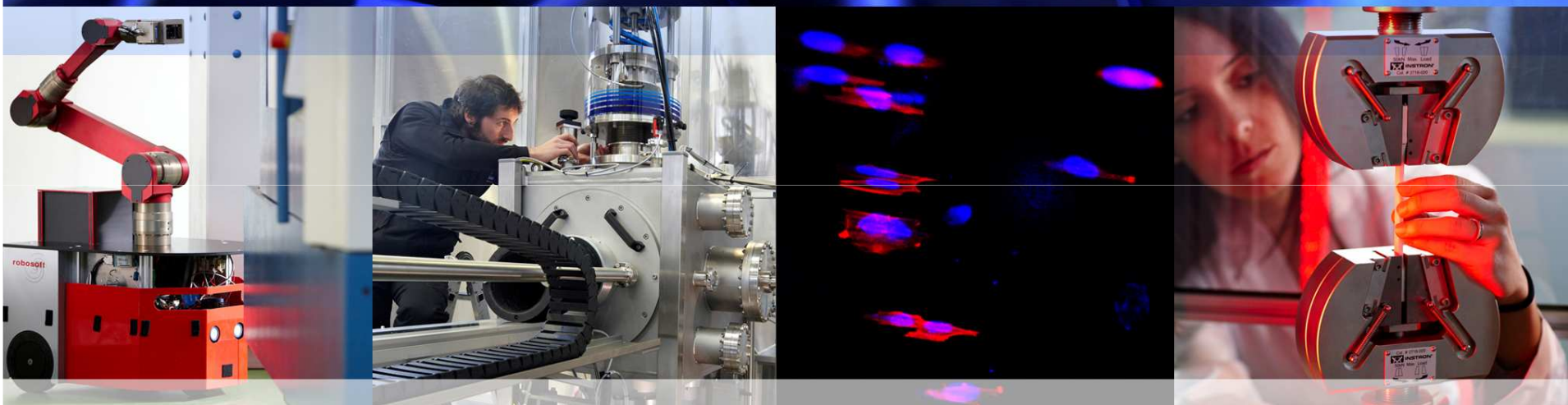
Risk Description	Impact (I)	Likelihood (L)	Ranking (I x L)	Planed action
<i>Technological Risks</i>				
Not adequate, exact or clear definition of specifications or requirements	4	1	4	There are some partners with experience in the industrial sectors involved within the partnership that will evaluate all decisions and results
<b>Pigment 1 and Pigment 3 cannot absorb enough percentage (40% in weight) of PCM</b>	<b>4</b>	<b>3</b>	<b>12</b>	<b>Contingency Plan</b>
Some of the coatings are not transparent enough (Transmission measured in a glass substrate is lower than 85% at visible range)	1	4	4	Anyway the coating will be applied to the pigment even the colour has changed (other colours will be obtained)



## ESR 2ª FASE – Nuestros puntos fuertes

3. Potential impact through the development, dissemination and use of project results : 4.2/5
- This will not only benefit the European SMEs concerned but also downstream industries like automotive, Construction, etc.





## **NANOPIGMY**

More than color: Applying nanotechnologies for the multifunctional ceramic pigments development.