Consultation results report

"THE DIGITAL TRANSFORMATION OF THE CONSTRUCTION SECTOR IN SPAIN"

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This document was coordinated by Ayming España within the framework of the work carried out by the Work Group launched by the Spanish Technological Construction Platform (PTEC) and led by INDRA: "Strategic Group for the Digital Transformation of the Construction Sector", composed of:

accenture	acciona Construcción	ACR Construcción	ALLTERRA
COLEGIO OFICIAL DE APAREJADORES Y ARQUITECTOS TÉCNICOS DE MADRID	apogea	ASECI	ATANGA
Azvi	Becsa Simetria	butic THE NEW SCHOOL be different	CAD.42 SAFER & SMARTER
CENTRO TECNOLÓGICO CARTIF	ceit MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE	CEMENTOS CRUZ	cemosa Ingeniería y Control
CEIM	ChatuTech	Ciemat	CIMNE EXCELENCIA SEVERO OCHOA
civigner	CNC Confederación Nacional de la Construcción	COMSA	COPASA
fecons PABEXPO	CSIC	ctcon Centro Tecnológico de la Construcción	cype
danosa Building together	idasein Ingeniería y Estructuras	EPCTracker Projects always on track	ERAIKUNE Construction Cluster
eurecat Centre Tecnològic de Catalunya	FUNDACIÓN LABORAL DE LA CONSTRUCCIÓN	FCC Construcción	ferrovial construcción
Finalcad Build your best	FRUMECAR Concrete, innovation and people.	CIAC CENTRO DE INNOVACIÓN APLICADA PARA LA CONSTRUCCIÓN SOSTENIBLE	Grant Thornton

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Content

1. Introduction

In 2019 the Spanish Technological Construction Platform (hereafter PTEC) launched a Work Group (WG) "Strategic Group for the Digital Transformation of the Construction Sector" led by INDRA.

The group's objective is to develop a national strategic plan within this context and promote the creation of specific grants for the construction sector in the framework program set to start in 2021.

In 2020, the dynamization activities for the strategic plan started, including the entire value chain of the construction sector, in order to contrast conclusions, obstacles and challenges. The dynamization tasks, surveys and workshops were conducted by Ayming España.

The European Strategic Research Agenda was taken as a starting point, developed by the European Construction, built environment and energy efficient building Technology Platform (ECTP), for the construction sector ("*ECTP Strategic Research & Innovation Agenda* 2021-2027"[1]) in which the sector's current obstacles, objectives, priorities, and challenges are identified from 2019 to 2030.

Given that this document covers the general interests of all the Member States of the European Union, it was necessary to specify the obstacles and challenges in Spain.

[1] http://www.ectp.org/resources/publications/

2. The consultation

Objective

The objective of this consultation was to collect opinions and carry out a contrast activity related to the digital transformation of the construction sector at a national level. This enabled information about strategies within organisations, obstacles that must be overcome and challenges they are faced with in the short and long term to be extracted.

Structure

To collect the information in an organised way, the consultation was carried out through an online form divided into four blocks.

- Digital Transformation Strategy. With the aim of extracting information about the companies' visions regarding digital transformation, getting to know the most popular technologies used by organisations or developing staff skills to cope with change.
- Obstacles. In this block a series of obstacles already identified by the WG is analysed. These will have to be overcome for the sector to reach the degree of transformation required to deal with the challenges of the future.
- Challenges. Intended to analyse the challenges identified by the members of the WG, which are aligned with the challenges identified in the European Strategic Agenda.
- Pilot projects. This final section intends to extract ideas about possible pilot projects that could facilitate the integration of digital technologies in the sector.

Dissemination

As the consultation was carried out, it was essential not only to reach the maximum number of possible agents on national territory, but also to approach the broadest possible range of entities.

To address this challenge, a *contact person* was identified in every Autonomous Community so as to provide the form to a higher number of agents in the region. This *contact person* had to be a "neutral" agent, so that they would not condition the participation of any of the organisations. Consequently, it was decided that the *contact person* had to be, where possible, an agent of knowledge (such as, for example, from a technological centre or a university), as well as a member of PTEC.

Additionally, other channels such as social media and the PTEC newsletter were used.

3. Consultation results

Participant profiling

As a result, the consultation received a total of 75 replies. How the participating agents were profiled is shown as follows:

Table 1. Nº of replies by entity typology

GRAN EMPRESA	12
MEDIANA EMPRESA	17
PEQUEÑA EMPRESA	16
ORGANISMO PÚBLICO DE INVESTIGACIÓN (OPI)	4
CENTRO TECNOLÓGICO (CT)	7
UNIVERSIDAD	5
ASOCIACIÓN/FUNDACIÓN	9
CLÚSTER	1
OTROS	4

The following figure shows the geographic distribution of the participants. Two aspects must be highlighted:

- No replies were received from the following Autonomous Communities: Aragon, Galicia, the Canary Islands, the Balearic Islands, La Rioja, the Autonomous City of Ceuta, and the Autonomous City of Melilla.
- Of the 16 replies received from the Autonomous Community of Madrid, 56%, which represents 9 of the replies, corresponds to entities headquartered in said Community but that operate at a national level.

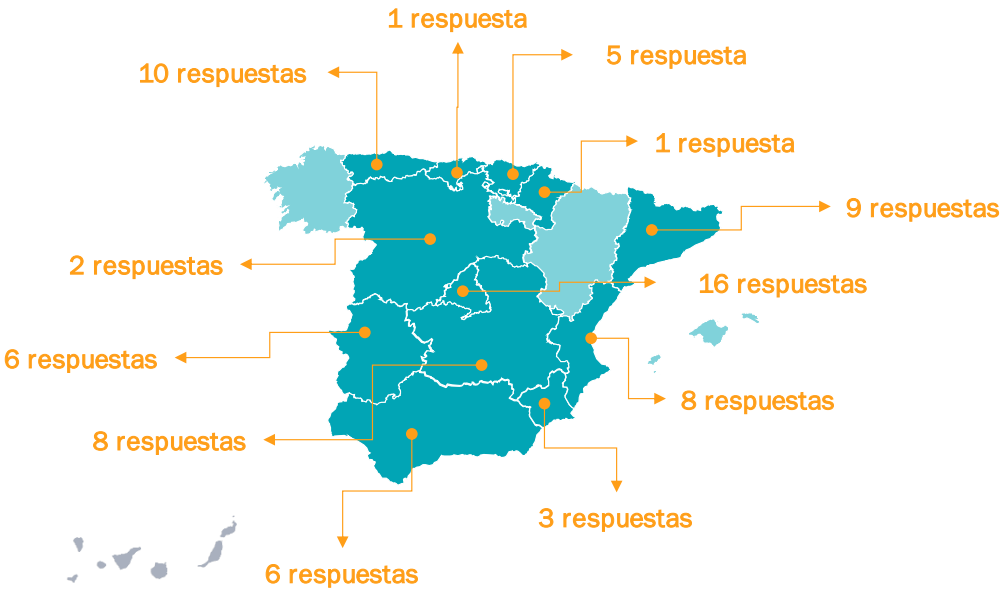


Figure 1. Geographic distribution of the consultation's participants

DIGITAL TRANSFORMATION STRATEGY block

The Digital Transformation Strategy block starts with a survey about the integration of these policies and the pillar of change in the organisation as a whole.

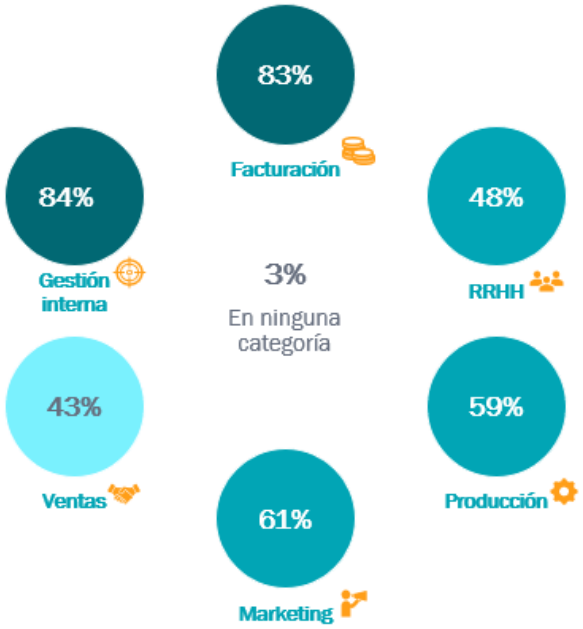
How does your organisation tackle digital transformation?	Opportunity	98,7%
	Threat	1,3%

Does your company have a digitisation strategy?	Yes	72%
	No	20%
	Not sure	8%

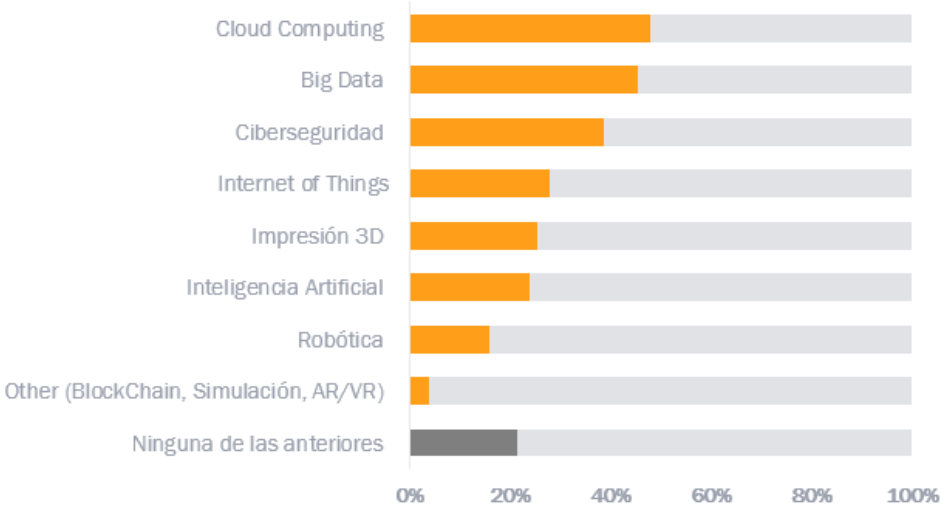
How do you think technology has an impact on:	the CONSTRUCTION SECTOR?	your ORGANISATION?
Impacto muy bajo ★☆☆☆☆	5,3%	2,7%
★★☆☆☆	16,0%	6,7%
★★★☆☆	33,3%	24,0%
★★★★☆	30,7%	41,3%
Impacto muy alto ★★★★★	14,7%	25,3%

To conclude, most of the survey's participants see digitisation as an opportunity, but only two thirds have a defined strategy. The majority of entities consider technologies to have an important impact on the construction sector as well as on their organisations.

For which of the following activities does your organisation use digital tools?



What new technologies does your organisation use?

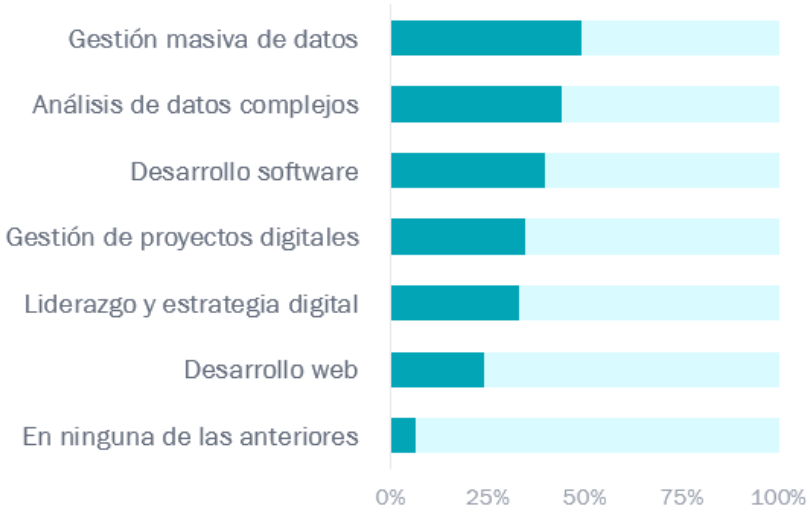


Most agents use Cloud technologies, Big data or technologies related to Cybersecurity. 20% of the survey's participants contemplate none of the mentioned technologies related to digitisation.

Regarding the **training of staff** in your organisation, how would you rate the following statements?

Leaders...	Employees...	... have the necessary skills and experience to implement a digital transformation strategy.
4,0%	4,0%	Totalmente en desacuerdo
21,3%	13,3%	
42,7%	37,3%	
22,7%	33,3%	
9,3%	12,0%	Totalmente de acuerdo

Which of these skills does your organisation lack the most?



Regarding training, employees are far from having acquired the necessary skills to be able to implement and work with a digital transformation strategy. In the case of leaders, this percentage slightly increases, but the numbers are low all the same. Additionally, analysing the fields of study, data management and handling is one of the areas in which they lack knowledge the most.

Conclusions

From this strategy block we can conclude that digital transformation is seen as an opportunity by the vast majority (98.7%) of agents consulted. This is backed by the fact that more than 70% say they have or are implementing a specific digital transformation strategy in their organisation.

Regarding the impact of technologies, most agents perceive it as being moderate in the sector, whereas in organisations technology is thought to be having a bigger impact.

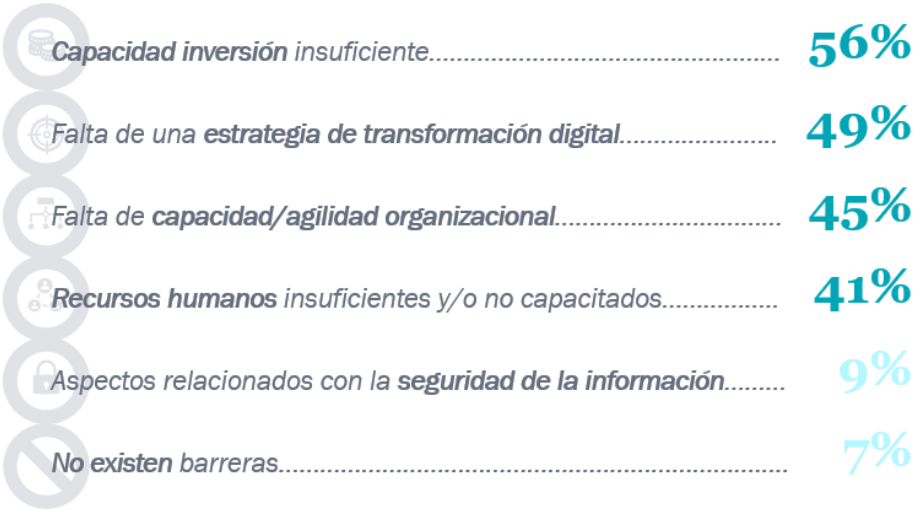
Currently, the activities for which digital tools are being used the most are internal management and invoicing, with 84% and 83% of replies, whereas sales is the activity for which they are used the least (43%).

When it comes to new technologies, the most frequently used in organisations (Cloud Computing and Big Data) are classified as the most voted, whereas robotics or other technologies (such as Blockchain, simulation or AR and VR) are the least voted. It is worth noting that 21% of participants do not use any of these forms of technology.

Concerning the training of staff, most participants share the opinion that neither leaders nor staff have the necessary skills and experience to implement a digital transformation strategy. Data mass management and complex data analysis are the areas that most lack the required skills.

OBSTACLES block

In your opinion, which of the following obstacles, at a global level, prevent your organisation from making the most of digital trends?



As a result of the consultation carried out on the participating entities of this Work Group, a series of obstacles specific to digital transformation were identified. These will appear in groups according to the scope they are related to:

- *Data*
- *Business model*
- *Value chain*
- *Technology/innovation*
- *Talent*

In your opinion, how much of an impact do the following obstacles have in the digital transformation process of the construction sector?

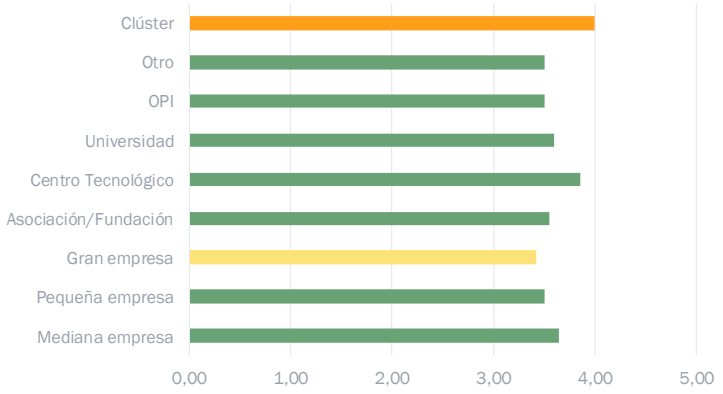
The values are shown from 1 to 5, meaning:

- **1,** obstacles with a **VERY LOW IMPACT** on digital transformation
- **5,** obstacles with a **VERY HIGH IMPACT** on digital transformation

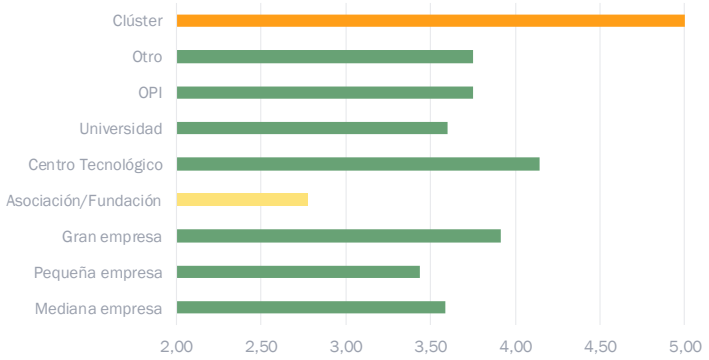
Next, we will display the graphs. Orange represents the entity that obtained the highest score, whereas yellow represents the entity with the lowest score.

DATA

Management and analysis of massive volumes of data and information *(BB-1)*

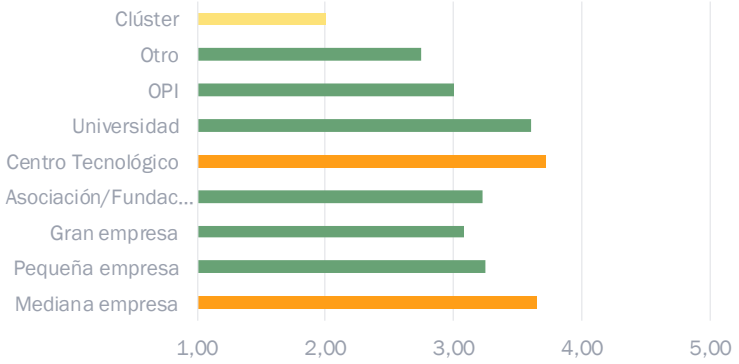


Decentralisation of data *(BB-2)*

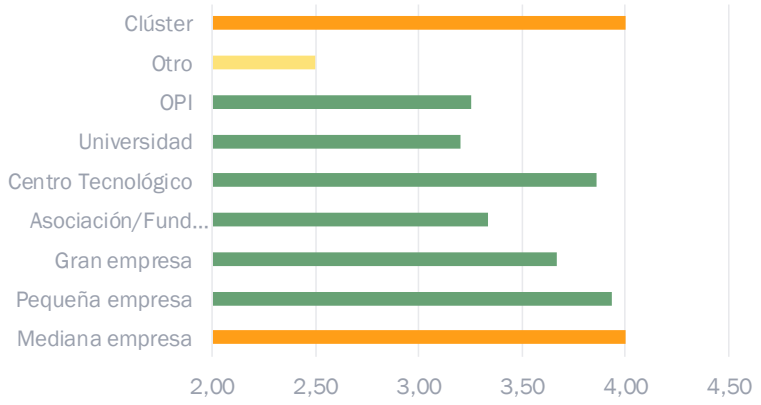


Business model

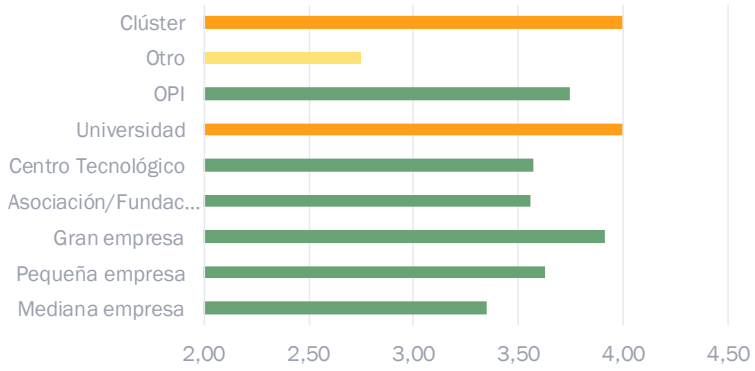
Long cash conversion cycles *(average periods of high collection)* *(BB-3)*



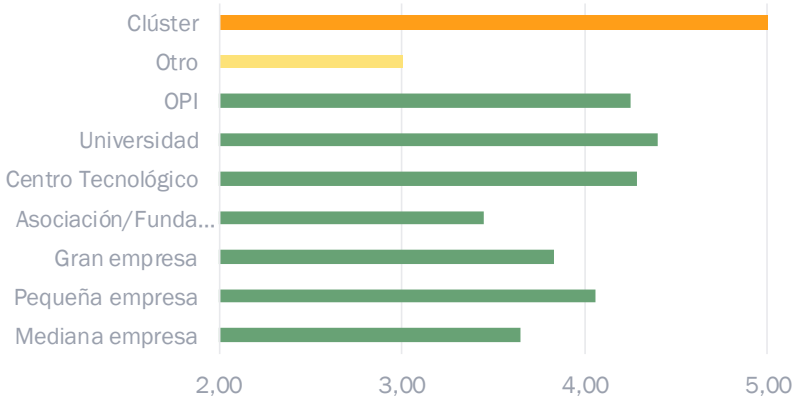
Focus on the price *(contracts based on speed of execution and prices)* *(BB-4)*



Public tender processes *(favour fragmentation → hinder applying BIM methodology to the whole life cycle)* *(BB-5)*

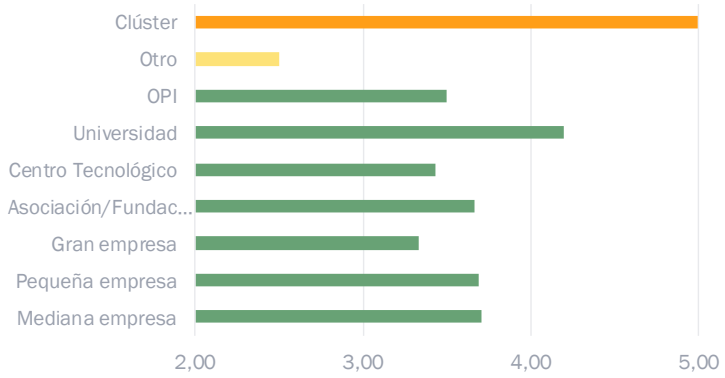


Digital Competitiveness *(lack of agility in adapting business model to the digital environment and to face technological "new entrants")* *(BB-6)*

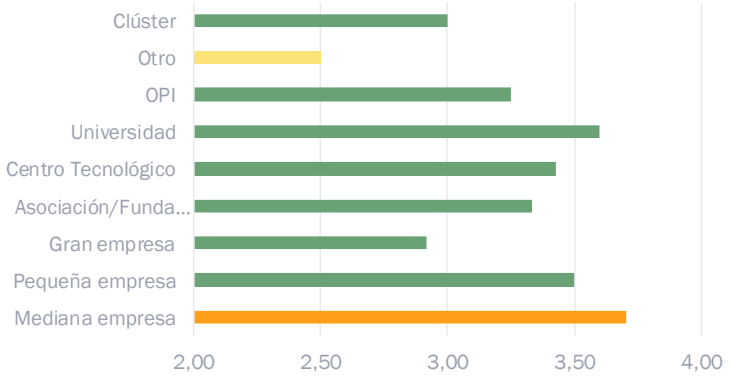


VALUE CHAIN

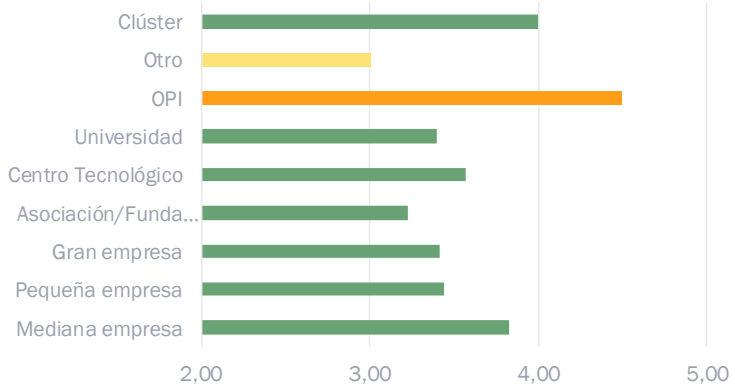
Market fragmentation and lack of structure *(BB-7)*



Low productivity of the sector *(risk not being able to meet future demands) (BB-8)*

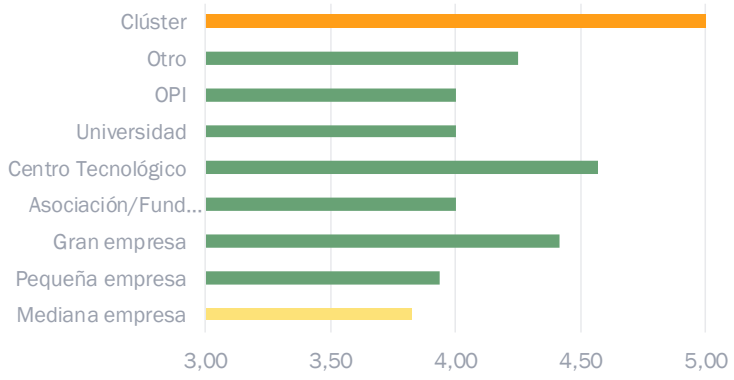


Wider gap between the sector's capacities and modernisation demands and improvements on already existing infrastructures *(BB-9)*

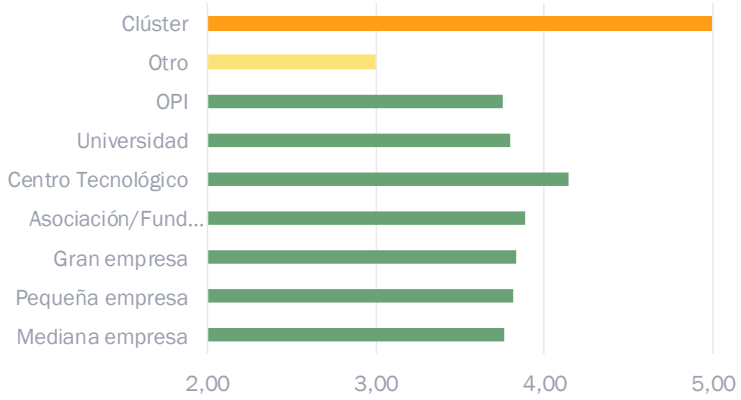


TECHNOLOGY/INNOVATION

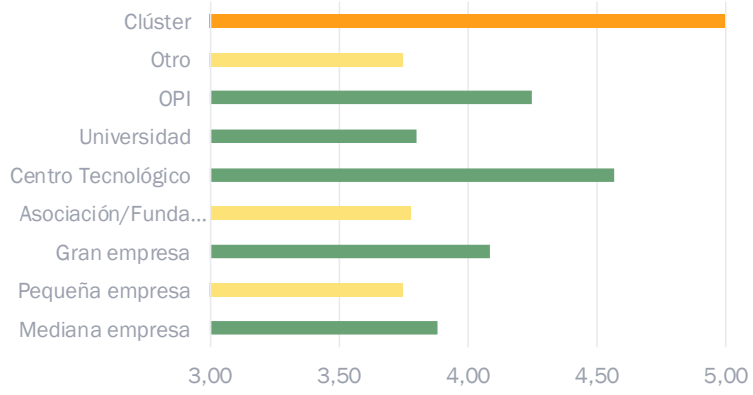
Conservative approach to innovation *(many entities prefer to wait for others to propel real innovation and react at a later time)* *(BB-10)*



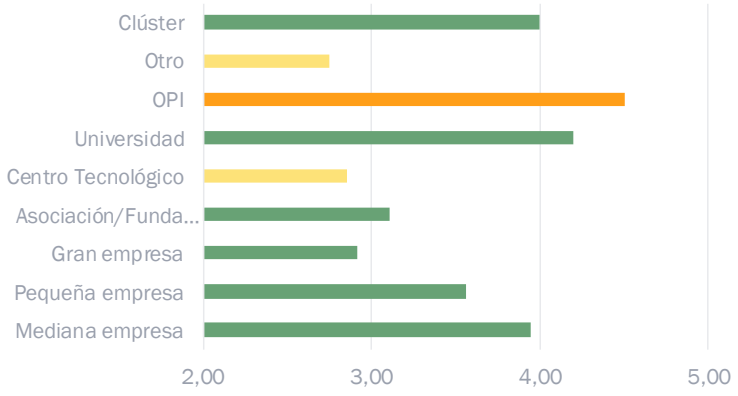
Lack of standardisation *(low inclusion rate of technological solutions with a focus on the sector within the framework of regulations and other standards)* *(BB-11)*



Lack of integration between systems *(numerous operational inefficiencies due to a lack of communication and interaction between different systems and technologies)* *(BB-12)*

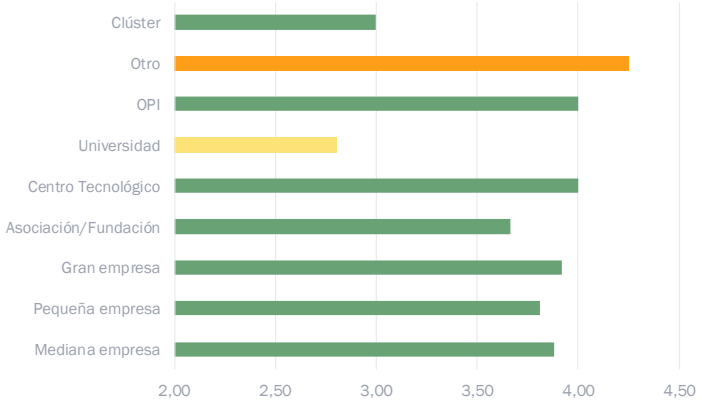


Technological Viability *(digitisation of construction and monitorisation require technologies that still need to prove their technical and financial viability) (BB-13)*



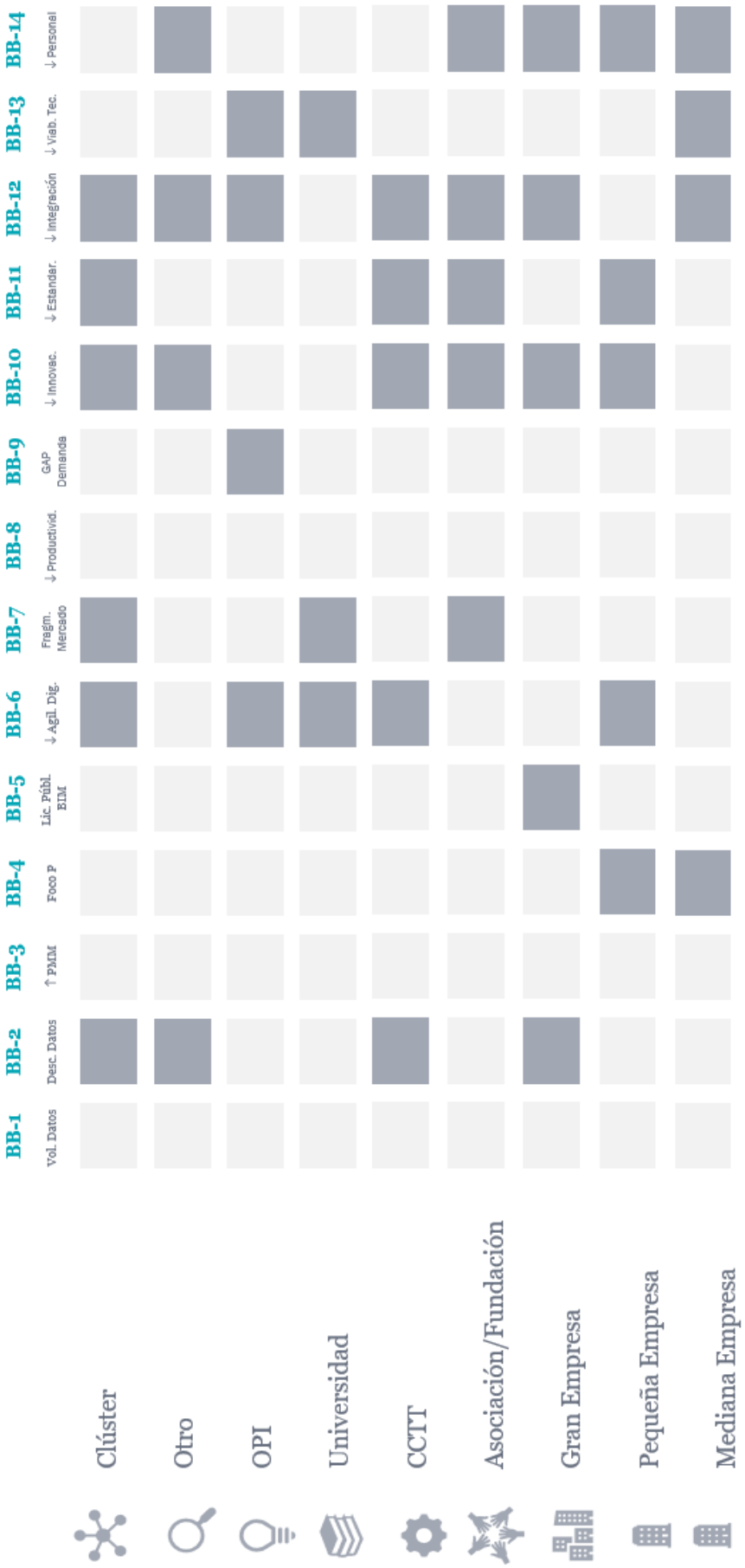
TALENT

Lack of trained and qualified staff *(BB-14)*



Conclusions

In the following figure you will find a matrix identifying the most voted obstacles (biggest impact on digital transformation) classified by agent typology.


BB-1
Vol. Datos
BB-2
Desc. Datos
BB-3
↑ PMM
BB-4
Foco P
BB-5
Lic. Públ. BIM
BB-6
↓ Agil. Dig.
BB-7
Fragm. Mercado
BB-8
↓ Productivid.
BB-9
GAP Demanda
BB-10
↓ Innovac.
BB-11
↓ Estandar.
BB-12
↓ Integración
BB-13
↓ Viab. Tec.
BB-14
↓ Personal
Clúster
Otro
OPI
Universidad
CCTT
Asociación/Fundación
Gran Empresa
Pequeña Empresa
Mediana Empresa

If the results are analysed on a global level, the 5 most voted obstacles, the ones that are considered to have the biggest impact on digital transformation, are the following:

1 BB-10

Acercamiento conservador a la innovación (muchas entidades prefieren esperar a que otros impulsen la verdadera innovación y reaccionar más tarde)

2 BB-12

Falta de integración entre los sistemas (existen numerosas ineficiencias operativas procedentes de la falta de comunicación e interacción entre los diferentes sistemas y tecnologías)

3 BB-6

Competitividad Digital (falta de agilidad para adaptar los modelos de negocio al entorno digital y hacer frente a los "new entrants" tecnológicos)

4 BB-11

Falta de estandarización (baja inclusión de soluciones tecnológicas con foco en el sector dentro de normativas y otros estándares)

5 BB-14

Falta de personal entrenado y cualificado

On the maps, the Autonomous Communities in which this obstacle was identified as the main one for digital transformation are marked in orange. In the case of a tie, all Communities with the same score will be selected.

For example, the obstacle “conservative approach to innovation” was the one with the highest score (biggest impact) in Castile and León, the Community of Madrid, Navarre, Catalonia, and Murcia.

Next, the results of this same analysis, but classified by agent typology will be shown. They have been divided into three big groups:

- Large Enterprises
- Small and Medium Enterprises (SMEs)
- Organisations that drive R+D+i (including PROs, Universities, Associations/Foundations, Clusters, or others)

1 BB-10

Acercamiento conservador a la innovación (muchas entidades prefieren esperar a que otros impulsen la verdadera innovación y reaccionar más tarde)

2 BB-12

Falta de integración entre los sistemas (existen numerosas ineficiencias operativas procedentes de la falta de comunicación e interacción entre los diferentes sistemas y tecnologías)

3 BB-14

Falta de personal entrenado y cualificado

3 BB-2

Descentralización de los datos

3 BB-5

Procesos de licitación pública (favorecen la fragmentación lo que dificulta aplicar la metodología BIM a todo el ciclo de vida)

Figure 2. Obstacles with the biggest impact on DT for Large Enterprises.

Figure 3. Obstacles with the biggest impact on DT for SMEs

Figure 4. Obstacles with the biggest impact on the sector's DT for Organisations that drive R+D+i

Throughout the analysis, the common obstacles by type of entity and their prioritisation can be observed. The analysis carried out between the variation in positions of the obstacles considered critical was interesting.

CHALLENGES block

The European Strategic R+D+i Agenda for the construction sector developed by the ECTP establishes 4 objectives for 2030. **Digital transformation** is one of them.

Within this objective, 4 priority areas have been identified:

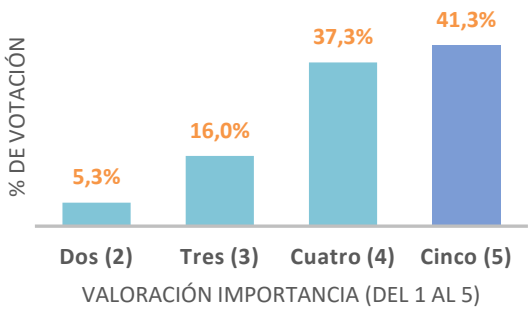
- Intelligent operation and maintenance of buildings and infrastructures
- BIM and Digital Twins for the integration of the value chain, with a special focus on SMEs
- Data privacy and security
- Better integration of built environment with urban space and mobility

In your opinion, **how important are these priority areas?**

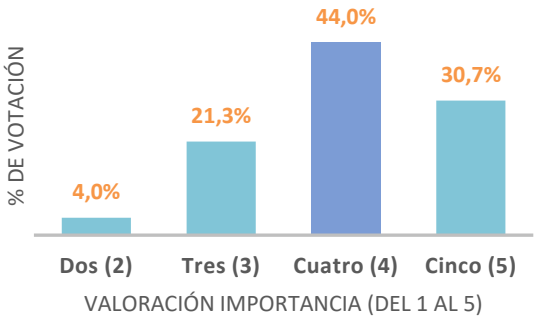
Values shown from 1 to 5, meaning:

- **1 VERY LOW IMPORATNCE**
- **5 VERY HIGH IMPORTANCE**

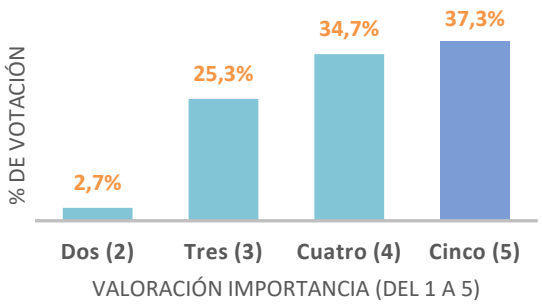
Intelligent operation and maintenance of buildings and infrastructures



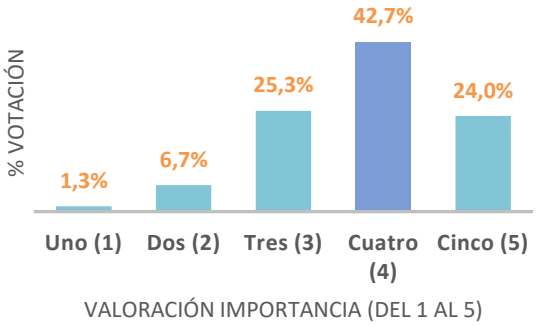
BIM and Digital Twins for the integrations of the value chain, with a special focus on SMEs



Data privacy and security



Better integration of built environment with urban space and mobility



Taking the information collected by the ECTP's Agenda as a base, the members of the Work Group identified a series of specific challenges to deal with in the short- and medium-term.

These challenges will appear classified as more general challenges:

- *Allow an integrated approach of the value chain*
- *Revolutionise operation and maintenance of built environment*
- *Guarantee a perfect and safe life for EU citizens*
- *Allow better integration with urban space and mobility*
- *Accelerate development and use of improved and more sustainable materials*

In your opinion, **how important do you think the following challenges are?**

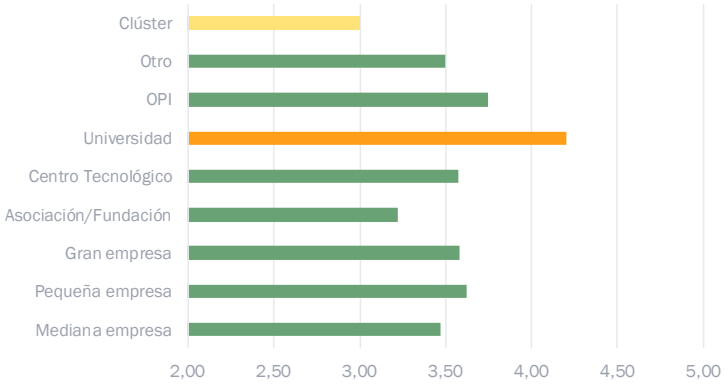
Values shown from 1 to 5, meaning:

- **1, UNIMPORTANT** challenge for digital transformation
- **5, HIGHLY IMPORTANT** challenge for digital transformation

On the graphs below, the entity marked in orange is the one that scored the highest. In yellow, the entity with the lowest score.

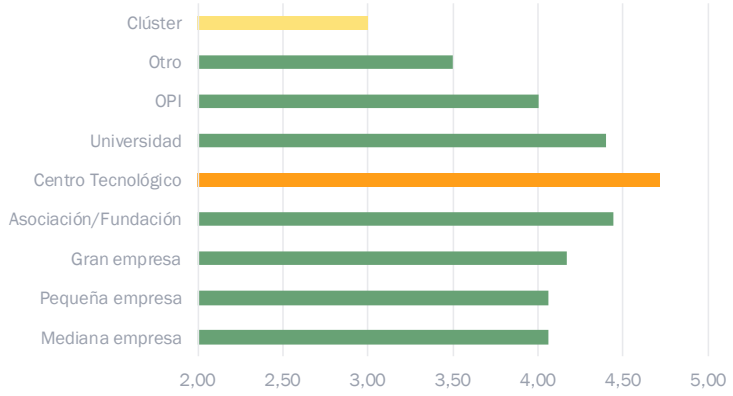
Allowing an integrated approach of the value chain

Generate a central data and algorithm learning platform that can be used as a foundation to create Artificial Intelligence applications and learning tools to improve knowledge about value chain from an integral point of view *(RR-1)*

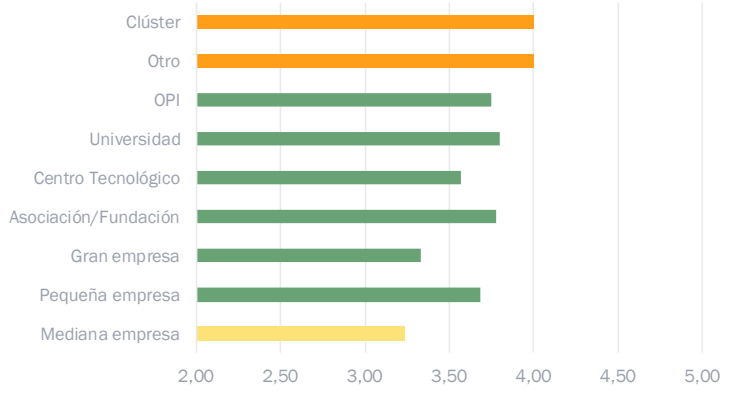


Create a holistic approach based on common European digital Platforms, BIM, IoT and Big Data (RR-2)

Achieve adaptation of BIM methodology as a base for life cycle and circular economy management (RR-3)



Carry out implementation and innovation on the supply chain to improve its efficiency by using disruptive technologies such as Blockchain (RR-4)



Revolutionise operation and maintenance of built environment

Manage, monitor, and maintain infrastructures and buildings by means of Big Data *(RR-5)*

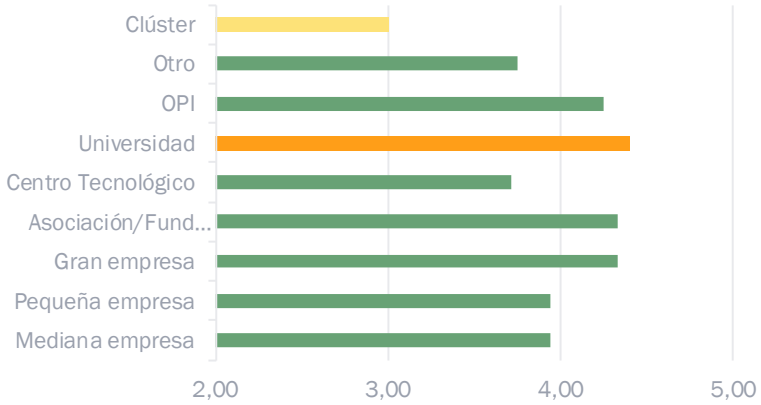
Create an open European database with information about the vulnerabilities of buildings and infrastructures *(RR-6)*

Guarantee a perfect and safe life for EU citizens

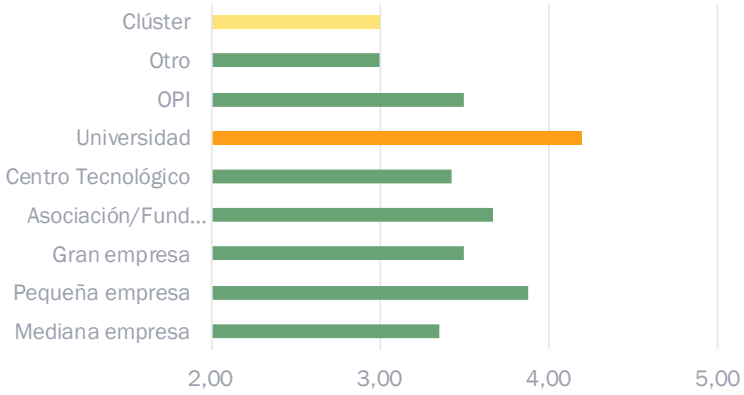
Guarantee data privacy by applying best practices and new technologies (MyData, MyBIM) *(RR-7)*

Use the Internet of Things and digitisation to offer a user-centred approach (RR-8)

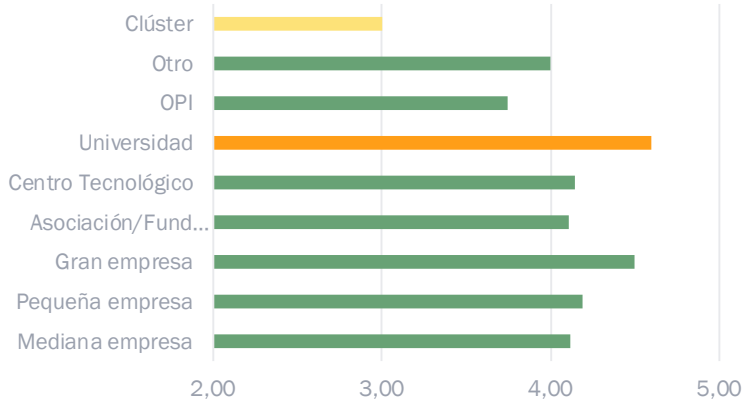
Improve the resilience and safety of buildings and infrastructures, especially of those that are state-owned (RR-9)



Create the digital identity passport (RR-10)

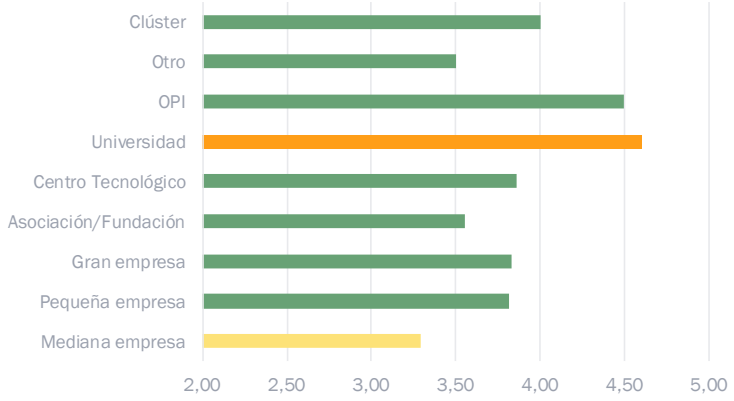


Correct existing vulnerabilities of the energy system to guarantee the supply of energy at all times (RR-11)

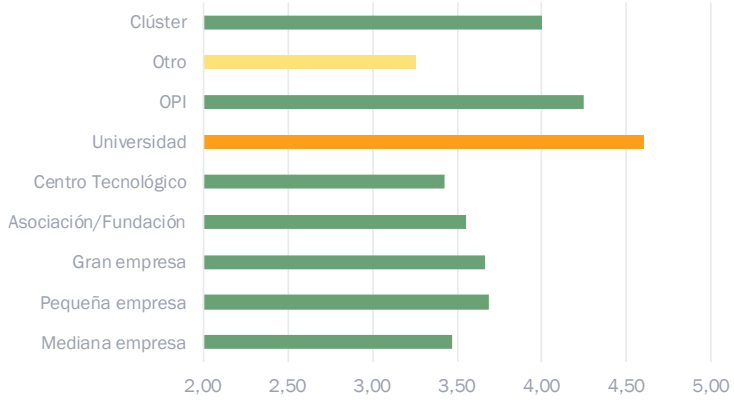


Allow better integration with the urban space and mobility

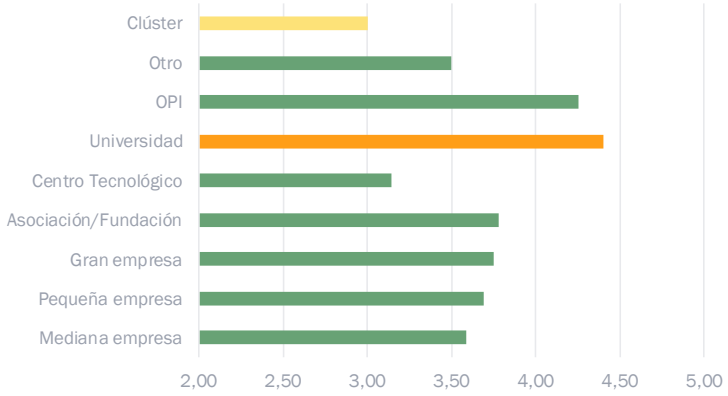
Develop and deploy TIM (Develop & deploy TIIM - Transport Infrastructure Information Modelling) and connect workflows and interoperability with the models of the cities (RR-12)



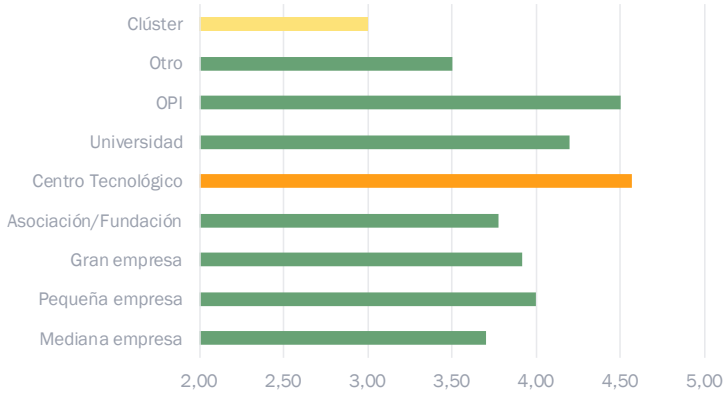
Create an interface with the European transport Platform to guarantee the safe integration of autonomous vehicles within the infrastructures (RR-13)



Create an interface with the European transport Platform to develop integrated multimodal and multi-stakeholders information exchanges (RR-14)

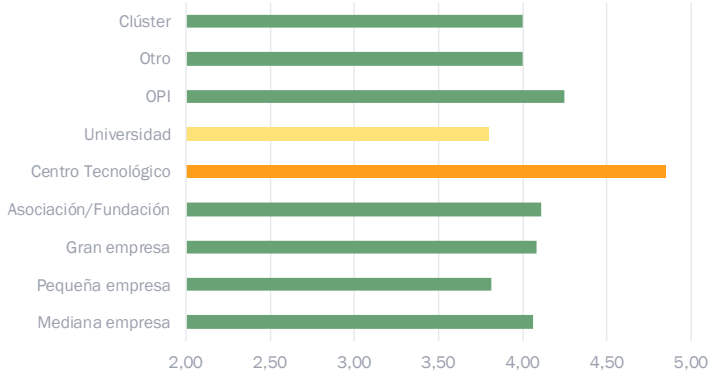


Carry out integration with other sources of energy (water, etc.) and services, especially during the planning phase (RR-15)



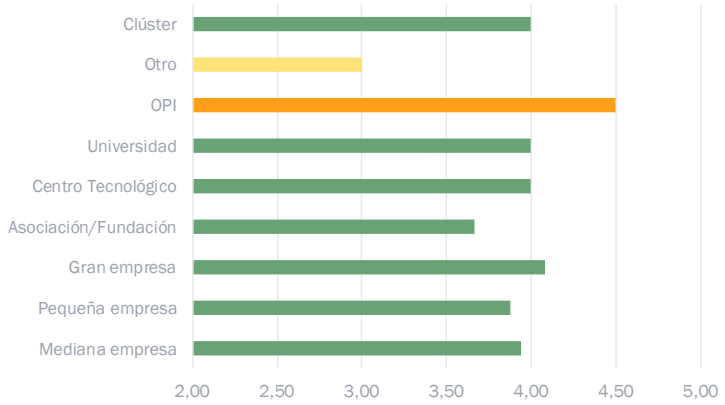
Accelerate the development and use of improved and more sustainable materials

Improve traceability of materials throughout the supply chain by using digital technologies (RR-16)

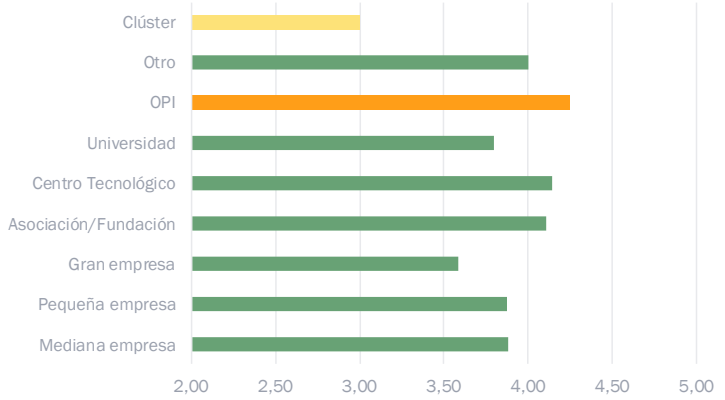


Generate a digital representation of the materials for 3D printing, prefabrication, and BIM integration, thereby improving the quality of the models and preventing possible interferences during the construction phase (RR-17)

Carry out modelling of materials, including modelling of performance over time (EMMC, EMCC) to improve the BIM models and enable the quality of different materials to be analysed (RR-18)



Equip the materials with integrated sensors to increase the amount of available data and information shown in the BIM models (RR-19)



Conclusions

The following figure shows a matrix in which the most highly rated challenges (the most important challenges to overcome for digital transformation) are identified and classified by agent typology.

	RR-1 Aprendiz. IA	RR-2 Enf. Hol. BIM, IoT, BD	RR-3 BIM ciclo V. EC	RR-4 Innov. Cad. Sum (BC)	RR-5 BD Infraestr.	RR-6 BBDD abierta	RR-7 Priv MyD. /MyBIM	RR-8 Custormer Centric	RR-9 Resiliencia y Seg.	RR-10 Pasaporte Id Dig	RR-11 Energía	RR-12 TIIM	RR-13 Plat. Veh. autón.	RR-14 Interfaz Multim.	RR-15 Integrac. E.	RR-16 Traz. Materiales	RR-17 Impr. 3D	RR-18 Mod. Rdto. EMMC/EMCC	RR-19 Sensores Integr.
Clúster					■		■	■											
Otro				■			■	■			■					■			■
OPI								■											
Universidad											■	■	■						
CCTT			■																
Asociación/Fundación			■		■				■										
Gran Empresa											■								
Pequeña Empresa											■								
Mediana Empresa		■					■				■					■			

If an analysis is carried out on a global level, the 5 most voted challenges, the ones which are considered most important for the sector's digital transformation, are the following:

On the maps, the Autonomous Communities in which this challenge was chosen as the most important for achieving digital transformation in the sector are marked in orange. In the case of a tie, all Communities with the same score will be selected.

For example, the challenge "correct the existing vulnerabilities of the energy system" was the one that scored the highest (the most important) in Castile-La Mancha, Asturias, and Cantabria.

Next, the result from the same analysis is shown, but this time according to agent typology. They have been divided into three big groups:

- Large Enterprises
- Small and Medium Enterprises (SMEs)
- Organisations that drive R+D+i (including PROs, Universities, Associations/Foundations, Clusters, or others)

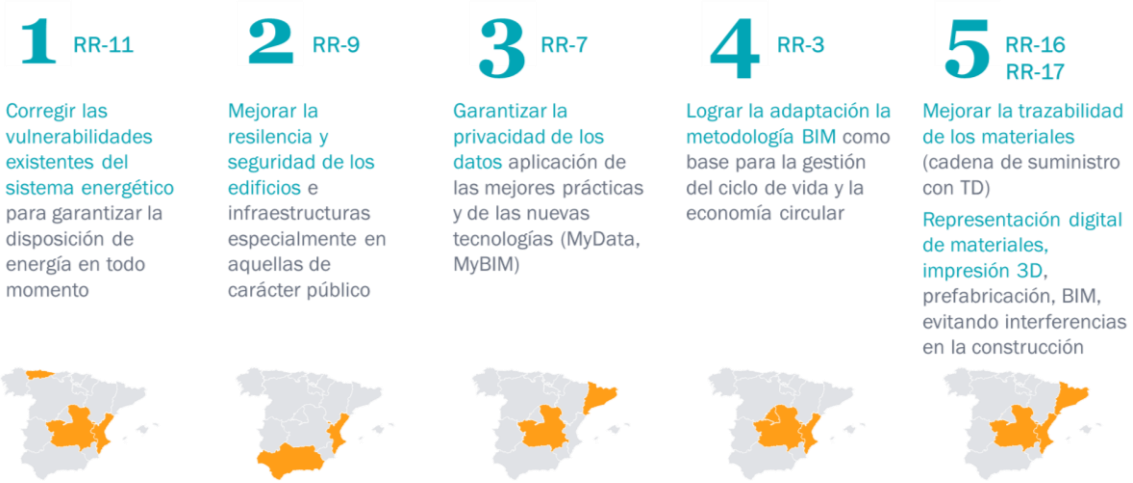


Figure 5. Most important challenges for DT in the sector for Large Enterprises

Figure 6. Most important challenges for DT in the sector for SMEs

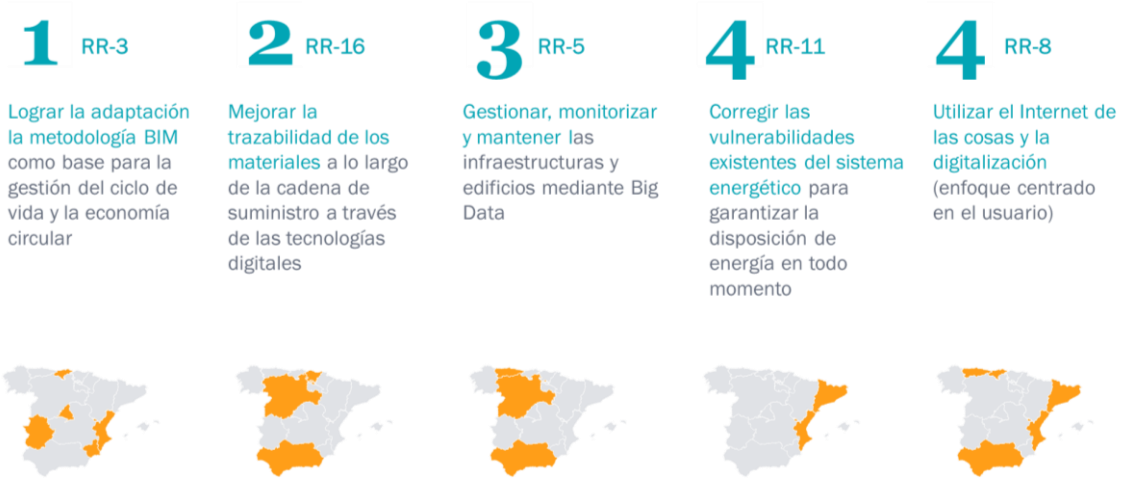


Figure 7. Most important challenges for DT in the sector for Organisations that drive R+D+i

This analysis shows the challenges that every type of entity faces, and the industrial network of Autonomous Communities. There are challenges that are only perceived by a studied collective and others in which the positions vary between them.

PILOT blocks

With the aim of facilitating the breakthrough of digital technologies in the sector, in your opinión, **what pilots that promote digital tools would it be interesting to carry out?**

- Small cell installation, enabling use of 5G technology.
- Create housing models in 3D infographics.
- Residential BIM with energy management.
- Demonstration in realistic environment of the use of digital technologies in a pilot that covers the complete life cycle of the building.
- Digitisation for control of different construction phases to be able to verify the execution compared to what was designed or previously executed.
- Pilots of temperature and acoustic data of buildings.
- Building pilots, infrastructures of delimited dimensions so as to implement the different digital tools and export them to a bigger dimension based on the results.
- Monitored pilot buildings.
- Database traceability and safety, as well as training staff for its management.
- More efficient data analysis for developing company projects.
- Chips and traceability for materials. Investments and information shared among manufacturers,
- Launch an e-commerce platform, control panel for tracking simulation, exploit Big Data regarding relationships with clients and for product purchases.
- Sound system program in buildings and infrastructures to better understand the reality of the constructed facility.
- Integration of sensors and data collection elements for high-rise and housing construction, where several companies may be involved.
- Public construction pilot that incorporates the digital tools for design, construction and maintenance and the new multiparty contract models with Blockchain technology.
- Work with standard models between all agents and/or tools.
- Develop Digital Twins
- Use different technologies to be able to easily trace the concrete used for certain constructions.
- Digital Management systems for construction, through collaborative platforms. Management of communications, documents, management processes, tasks, alerts, post-sales management.
- Control raw sewage leakages and prevent floods.
- Collaborative Platform for Statute of Limitations of Constructive Systems for Restoration.
- Evaluate the efficiency of progress control methods by using AR or VR technologies.

- Malaga Metro (small network therefore suitable for pilot project). TIIM of existing lines and construction of new sections.

Keywords

Monitorización

Entorno real

Realidad virtual o aumentada

Ciclo de vida completo

Blockchain

Control ejecución vs diseñado

Datos (acústica, temperatura)

Trazabilidad

Edificios (estructuras acotadas)

Integración de sensores

4. Study of Intelligent Specialisation Strategies (RIS3)

This section includes a brief analysis that links the digital transformation challenges identified by the WG to the priorities selected in the RIS3 Strategies in the different regions of Spain.

The objective here is to be able to identify (match in green) the RIS3 priorities (or priority sectors) of Communities where digital transformation challenges may arise.

Identified challenges:

- *Allow an integrated approach of the value chain*
    - *Generate a central data and learning platform that can be used as a base to create Artificial Intelligence applications and learning tools to broaden knowledge of the value chain from an integral point of view*
    - *Create a holistic approach based on common European digital Platforms, BIM, IoT and Big Data*
    - *Achieve adapting BIM methodology as a base for life cycle and circular economy management*
    - *Carry out implementation and innovation of the supply chain to improve its efficiency by using disruptive technologies such as Blockchain*
- *Revolutionise operation and maintenance of built-up environment*
    - *Manage, monitor and maintain infrastructure and buildings by means of Big Data*
    - *Create an open European database with information about the vulnerabilities of buildings and infrastructures.*
- *Guarantee a perfect and safe life for EU citizens*
    - *Guarantee data privacy by applying best practices and new technologies (MyData, MyBIM)*
    - *Use the Internet of Things and digitisation to offer a user-centred approach*
    - *Improve the resilience and safety of buildings and infrastructures, especially of those that are state-owned*
    - *Create the digital identity passport*
    - *Correct existing vulnerabilities of the power system to guarantee the supply of energy at all times*
- *Facilitate better integration with the urban environment and mobility.*
    - *Develop and deploy TIIM (Develop & deploy TIIM - Transport Infrastructure Information Modelling) and connect workflows and interoperability with the models of cities*
    - *Create an interface with the European transport platform to guarantee the safe integration of autonomous vehicles with the infrastructure.*
    - *Create an interface with the European transport platform to develop multimodal and multi-stakeholder integrated information exchanges*
    - *Carry out integration with other sources of energy (water, etc.) and services, especially during the planning phase*

- ***Accelerate development and use of improved and more sustainable materials***
    - *Improve traceability of materials throughout the supply chain by using digital technologies*
    - *Generate a digital representation of materials using 3D printing, prefabrication, BIM integration, thereby improving the quality of models and preventing possible interferences in the construction phase*
    - *Carry out modelling of materials, including modelling of performance over times (EMMC, EMCC) to improve the BIM models and enable the quality of different materials to be analysed*
    - *Equip the materials with integrated sensors to increase the amount of available data and information shown in the BIM models*

		RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
ANDALUCÍA	Movilidad y logística					
	Industria avanzada vinculada al transporte					
	Recursos endógenos de base territorial					
	Turismo, cultura y ocio					
	Salud y bienestar social					
	Agroindustria y alimentación saludable					
	Energías renovables, eficiencia energética y construcción					
	TIC y economía digital					

		RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
ARAGÓN	Conectividad					
	Eficiencia de los recursos					
	Bienestar y Calidad de vida					

		RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
ASTURIAS	Materiales avanzados y sostenibles					
	Nuevos modelos de producción					
	Suministros. Tecnologías para redes					
	Asturias polo industrial del acero					
	Mercados agroalimentarios					
	Envejecimiento demográfico y calidad de vidad					

		RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
BALEARES, ISLAS	Sostenibilidad territorial					
	Gestión innovación e internacionalización empresas					
	Turismo de bienestar y calidad de vida					
	Conocimiento para el cambio turístico					
	Tecnologías turísticas					

COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
		Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
CANARIAS, ISLAS	Liderazgo inteligente del turismo					
	Canarias, referente atlántico inteligente					
	Valorización socieconómica de la I+D, especialización y fortalecimiento en astrofísica y espacio, ciencias marítimo-marinas, biotecnología y biomedicina					
	Crecimiento verde y sostenible					
	Agenda digital					

COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
		Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
CANTABRIA	Turismo					
	Agroalimentación					
	Transformación metálica					
	Química					
	Maquinaria y componentes de automoción					
	Biotecnología					
	Ingeniería marítima					
	Comunicaciones satélite y radiofrecuencia					

COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
		Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
CASTILLA Y LEÓN	Agroalimentación y recursos naturales					
	Sectores de transporte como automoción y aeronáutico					
	Salud en atención social, cambio demográfico y bienestar					
	Patrimonio natural, patrimonio cultural y Lengua Española					
	I+D en TIC, Energía y Sostenibilidad					

COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
		Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
CASTILLA-LA MANCHA	Agroalimentación					
	Industria manufacturera tradicional (calzado, textil, etc.)					
	Turismo-cultura					
	Sector aeronáutico					
	Medio ambiente y energía					
	Bioeconomía					

COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
		Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
CATALUÑA	Agro-food					
	Energía y recursos					
	Sistemas industriales					
	Industrias con base el diseño					
	Industrias basadas en movilidad sostenible					
	Industria de la salud					
	Industria cultural					

COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
		Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
COMUNIDAD DE MADRID	Nanotecnología, Materiales avanzados, Tecnologías Industriales y del Espacio					
	Área Salud, Biotecnlogía, Agua y Agroalimentación					
	Área Energía, Medio Ambiente y Transorte (incluido aeronáutica)					
	Área Tecnologías de la Información y las Comunicaciones y servicios de alto valor añadido					

COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
		Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
COMUNIDAD VALENCIANA	Calidad de vida- Agroalimentario, cosmética y productos para el					
	Calidad de vida- promoción de la salud y sanidad eficiente					
	Calidad de vida- Turismo					
	Producto innovador - Bienes de consumo personalizado					
	Producto innovador - Hábitat: la vivienda y su entorno					
	Procesos avanzados de fabricación - automoción y movilidad					
	Procesos avanzados de fabricación - Bienes de equipo					

COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
		Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
EXTREMADURA	Gestión sostenible de los recursos naturales					
	Tecnologías para la calidad de vida					

COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
		Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
GALICIA	Nuevo modelo de gestión de recursos naturales y culturales basado en la innovación (mayor valor añadido en actividades energéticas, acuícolas, farmacológicas, cosméticas, alimentarias e culturales)					
	Nuevo modelo industrial sustentado en la competitividad y el conocimiento (Tecnologías Facilitadoras Esenciales)					
	Nuevo modelo de vida saludable basado en el envejecimiento activo de la población					

COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
		Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
MURCIA, REGIÓN DE	Agroalimentación					
	Agua					
	Medio ambiente					
	Logística transporte					
	Turismo					
	Habitat					
	Salud					
	Marino marítimo					
	Energía					

COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
		Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
NAVARRA, COMUNIDAD FORAL DE	Automoción y mecatrónica					
	Cadena alimentaria					
	Energías renovables y recursos					
	Salud					
	Turismo integral					

COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
		Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
PAÍS VASCO	Energía					
	Fabricación avanzada					
	Biociencias					

COMUNIDAD AUTÓNOMA	PRIORIDADES DEFINIDAS EN LA RIS3	RELACIÓN CON LOS RETOS IDENTIFICADOS EN TRANSFORMACIÓN DIGITAL				
		Permitir un enfoque integral de la cadena de valor	Revolucionar la operación y el mantenimiento del entorno edificado	Asegurar una vida perfecta y segura para los ciudadanos de la UE	Permitir una mejor integración con el espacio urbano y la movilidad	Acelerar el desarrollo y el uso de materiales mejores y más sostenibles
RIOJA, LA	Agroalimentación					
	Industria madera y mueble					
	Industria manufacturera avanzada (metal y automoción)					
	Industria del calzado					