



# European Construction Sector Observatory

Policy fact sheet

Portugal

Portuguese Construction Technology Platform

Thematic objectives 1, 2, 3, 4 & 5

April 2019

## In a nutshell

Implementing body	The Portuguese Construction Technology Platform (Plataforma Tecnológica Portuguesa da Construção – PTPC) is a non-profit legal entity.
Key features & objectives	The PTPC aims to improve the competitiveness of the Portuguese construction sector by fostering collaboration among relevant stakeholders and promoting RD&I projects.
Implementation date	2011
Targeted beneficiaries	Construction companies, industry associations, research institutions, public sector.
Targeted sub-sectors	All construction sub-sectors.
Budget (EUR)	583 million (investment) 436 million (incentives) <sup>1</sup>
Good practice	★★★★☆
Transferability	★★★★★

European Technology Platforms (ETPs) were the first type of public-private partnership to be established in the field of research at European level. Founded in 2003 by the European Council, they were then further developed and supported by the European Commission. ETPs are industry-led stakeholder fora that are tasked with defining and implementing a strategic research agenda for a specific area of technology. In doing so, they help to define the topics and priorities of research programmes at European, national and regional level. The European Commission currently recognises 38 ETPs as key drivers of innovation, knowledge transfer and European competitiveness.

One example of an ETP is the European Construction Technology Platform (ECTP)<sup>2</sup>. It was founded in 2004 as a leading membership organisation with the aim of promoting and influencing the future of the

built environment<sup>3</sup>. The ECTP is industry-led and has a diverse membership that includes around 150 public and private organisations from across the broad construction sector and the entire value chain of the built environment. The ECTP membership is made up of large and small businesses, industry associations, research and academic institutions, and public sector organisations from 21<sup>4</sup> Member States, as well as Israel, Norway, Switzerland and Turkey. This diverse membership enables the ECTP to tackle important issues affecting the built environment using an integrated approach. The main areas of focus of the ECTP include active aging and design, energy efficient buildings, heritage and regeneration, infrastructure and mobility, and materials and sustainability. The ECTP also promotes the creation of a network of national platforms to address national needs and to drive innovation and transformation in national construction sectors.

In 2008, the Portuguese Institute of Public Markets, Real Estate and Construction (*Instituto dos Mercados Públicos, do Imobiliário e da Construção – IMPIC*) proposed the creation of a Portuguese platform. However, it was not until 2011 – when the economic crisis in the construction sector reached its peak – that the Portuguese Construction Technology Platform (*Plataforma Tecnológica Portuguesa da Construção – PTPC*) was finally established<sup>5</sup>. There were various reasons for the three-year delay in the launch of the PTPC, one of which was that Portuguese construction companies were initially resistant to the idea of working together and cooperating<sup>6</sup>.

The PTPC is an important tool to guide and support the development of the Portuguese construction sector. Representing about 7% of GDP and employment in Portugal<sup>7</sup>, the construction sector is facing a range of important challenges, such as Industry 4.0, digital transformation, the skills shortage, environmental issues and the need to help Portuguese companies to compete internationally. The PTPC is an ongoing collaborative initiative that is designed to address these challenges using an integrated

approach. Market surveillance, the promotion of (and investment in) collaborative research, development and innovation (RD&I), and holistic industry-led contributions to policy-making are key elements of the work of the PTPC.

The PTPC has been broadly successful to date, having established the key mechanisms for delivering and achieving its objectives thus far. The main improvements recommended concern, inter alia, the greater involvement of technology companies and architects, and a stronger focus on helping construction companies (especially smaller companies) to embrace the digital challenge and improve their competitiveness.

## 1.

## General description

Headquartered in Porto, the **Portuguese Construction Technology Platform** aims to improve the competitiveness of the Portuguese construction sector by promoting research and innovation (R&I) projects and by fostering collaboration between relevant stakeholders. Its members include private companies, industry associations, public sector organisations, and members of the National Scientific and Technological System (Sistema Científico e Tecnológico Nacional – SCTN) such as high schools, research institutions, and universities.

With over 50 member organisations<sup>8</sup>, the **composition** of the PTPC<sup>9</sup> for the period 2018-2020 is made up of four bodies: the General Assembly (*Assembleia Geral*), the Supervisory Board (*Conselho Fiscal*), the Strategic Board (*Conselho Estratégico*), and the Executive Commission (*Comissão Executiva*), whose members come from a wide variety of member organisations from the public and private sector<sup>10</sup>. For instance, the President of the General Assembly<sup>11</sup> is from the Institute of Public Markets, Real Estate and Construction (IMPIC), whereas the President of the Executive Commission is from a private company<sup>12</sup>.

### The PTPC has five main objectives:

1. To promote innovation through collaboration, ensuring the dissemination of results and technology transfer;
2. To create a technological monitoring centre to promote the production and dissemination of knowledge;
3. To promote investment in R&I activities to update current systems, products and processes;
4. To develop new and innovative business and management models;
5. To promote the development of innovative information technologies for businesses<sup>13</sup>.

The Statutes of the PTPC<sup>14</sup> establish six different sources of income:

1. Membership fees<sup>15</sup>;
2. Interest and income from its assets<sup>16</sup>;
3. Provision of services<sup>17</sup>;
4. Publication edition;
5. Donations, contributions and subsidies;
6. Any other revenue established by law, regulation or contract.

PTPC objectives are being delivered through four **strategic activities**<sup>18</sup>:

1. Promote construction knowledge and technology surveillance;
2. Influence the Technological Research and Development Agenda (IDT) of the SCTN for the needs and challenges of the construction market;
3. Promote R&I project consortia and help to raise funds;
4. Influence R&I construction policies in Portugal and, through the ECTP, at European level.

Currently, the activities of the PTPC are being carried out by 8 **working groups** (WGs):

- *WG1 BIM* aims to produce National Building Information Modelling Standards and ensure their adoption and wide implementation in the national construction industry, as well as the sharing of best practices<sup>19</sup>;
- *WG2 Renovation (Reabilitação)* supports the implementation of good practices and the technological development of renovation interventions. The main objective is the creation of a Renovation Knowledge Centre web platform to bring renovation knowledge under one roof and to promote holistic renovation solutions that encompass structural behaviour (including seismic resistance), comfort (thermal, acoustic, etc.) and sustainability<sup>20</sup>;
- *WG3 Road Pavements (Pavimentos Rodoviários)* promotes research and development of innovative products and solutions (e.g. new materials, lifecycle analysis, eco-design, forecast models, etc.) to be applied in road, airport and other pavements<sup>21</sup>;

- *WG4 SIC (Sistemas de Informação na Construção)* is the IT Systems in Construction WG that promotes the advantages of ICT solutions throughout the construction process lifecycle. It also deals with systematisation and standardization<sup>22</sup>;
- *WG5 Barragens* promotes studies related to innovative construction processes, materials and lifecycles<sup>23</sup>;
- *WG6 Geotechnics and Foundations (Geotecnica e Fundações)* focuses on construction knowledge management, covering for example, the state of the art, trends, legislative developments, disruptive technologies, etc.<sup>24</sup>;
- *WG7 Maritime and Port Infrastructure (Infraestruturas Marítimo-Portuárias)* addresses numerical physical modelling as an analysis tool for maritime projects<sup>25</sup>;

- *WG8 Water Infrastructure (Infraestruturas de Águas)* deals with water loss control, infrastructure rehabilitation management and water infiltration control, among others<sup>26</sup>.

PTPC activities are also linked with a range of **Horizon 2020 Societal Challenges**:

- Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy;
- Secure, clean and efficient energy;
- Smart, green and integrated transport;
- Climate action, environment, resource efficiency and raw materials;
- Leadership in Enabling and Industrial Technologies (especially nanotechnologies and materials)<sup>27</sup>.



## 2.

## Achieved or expected results

The **Technology Observatory (*Observatório Tecnológico*)** was created by the PTPC to promote technological development in construction, based on new technology surveillance and the dissemination of knowledge. The Observatory provides PTPC members with studies on construction trends, information on technical and scientific papers, patents and success stories, as well as news on construction technologies and a repository with research organisations<sup>28</sup>.

**Technology Observatory activities are contributing to the achievement of the PTPC's first two main objectives.**

The PTPC coordinates the **Architecture, Engineering and Construction (AEC) Cluster (Cluster AEC – *Arquitetura, Engenharia e Construção*)**, which is recognised as a Competitiveness Cluster by the Portuguese Agency for Competitiveness and Innovation (IAPMEI)<sup>29</sup>. A Competitiveness Cluster is an aggregator platform of knowledge and skills, consisting of partnerships and networks that integrate companies, business associations, public authorities and relevant support institutions, including non-corporate entities of the research and innovation ecosystem, sharing a common strategic vision to achieve higher levels of competitiveness through cooperation<sup>30</sup>.

The AEC Cluster brings together construction sector knowledge and skills and promotes research activities to boost the competitiveness of the sector<sup>31</sup>. With more than 80 member organisations, the main strategy of the AEC Cluster focuses on promoting RD&I investment and internationalisation as key drivers for improving the competitiveness of the Portuguese construction sector.

**AEC Cluster activities are contributing to the achievement of all five of the main objectives of the PTPC.**

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The Cluster's activities aim to<sup>32</sup>:

- Encourage RD&I activities in partnership;
- Increase exports and qualified employment;
- Promote the international visibility of the sector;
- Strengthen skills within the sector;
- Promote cooperation and partnerships.

The PTPC has organised seven Strategic Forums, which have brought together construction sector stakeholders to discuss important developments in the sector. Each has contributed to the achievement of the PTPC's main objectives (1, 3 and 5 in particular). Due to the success of these events, the European Commission entrusted the PTPC with the organisation of the **EU Industry Day 2018** in Lisbon<sup>33</sup>.

**The PTPC is actively influencing and shaping:**

- **The Technological Research and Development Agenda (IDT) of the SCTN to ensure it addresses the needs and challenges of the construction market; and**
- **R&I construction policies in Portugal and, through the ECTP, at European level.**

The PTPC has recently contributed to the **National Investment Plan 2030** (Portugal and the Future of Cohesion Policy – A contribution to the 2030 National Investment Plan)<sup>34</sup>. The Plan recommends 78 measures that are grouped under three horizontal thematic priority objectives (Qualification and Professional Training, Innovation and Modernisation, and Demographic Challenge) and three thematic objectives with territorial impact (Energy and Climate Change, Territorial Identity, and expansion of Global networks and the Iberian Market). Table 1 provides a brief summary

of the measures recommended by thematic objective.

Table 1: Examples of recommended measures

Thematic objectives	Recommended measures
Vocational training & certification	Focus on new technologies and digital transformation
Innovation & modernisation	Foster digital transformation and the adoption of new technologies
Demographic challenge	Guarantee equitable accessibility to buildings for all citizens
Energy & climate change	Stimulate the development of smart cities
Territorial identity	Create a national geographical system on which all actors able to change the territory can work to avoid interoperability problems and allow an efficient use of natural resources
Global networks & the Iberian market	Improve current infrastructure and analyse the need for new infrastructure

Source: Cluster AEC, Portugal e o futuro da Política de Coesão<sup>35</sup>

The PTPC is also currently preparing the **Strategic Innovation and Competitiveness 2030 Action Plan**

for the AEC Sector (*Plano Estratégico de Inovação e Competitividades 2030 para o Setor AEC*), which will include the main strategic action lines that will guide the sector in the coming years, as well as a set of activities that will allow the implementation of the strategy. The five strategic areas are:

- Research, development and innovation (RD&I);
- Internationalisation;
- Cooperation and partnerships;
- Qualification and skills;
- Public policy.

## 3.

## Perspectives and lessons learned

Information and communication technologies (ICTs) have the potential to add significant value to the broad Portuguese construction sector, but they are not yet being sufficiently exploited across the sector. According to the President of the PTPC and the AEC Cluster, people in Portugal have excellent ICT skills but there is a need to bring them into the broad construction sector. The use of ICTs would add value to all areas of the built environment in Portugal, from smarter physical buildings, systems and infrastructure to an increased capacity to generate, gather and process meaningful information<sup>36</sup>.

**Portuguese architecture and engineering are two areas that have undergone a radical transformation over the last 15 years, largely because they have embraced the use of ICTs and digital technologies.**

According to the Portuguese Minister of Economy, this transformation has helped to raise Portugal's international profile and the reputation of the sector. Portugal now exports high quality architecture, engineering and construction and has internationally recognised companies with the capacity to carry out complex projects, including in challenging countries with a low level of development<sup>37</sup>.

**Digital transformation is the key challenge facing the broad construction sector in Portugal. The Minister of Economy highlights the disparity between architects and engineers that are already accustomed to working in digital environments, and other operators in the sector, such as subcontractors and materials suppliers, that are still reacting to the change. Only by addressing this disparity can the sector as a whole take full advantage of the benefits that digitalisation offers<sup>38</sup>.**

Improved quality, efficiency gains and a reduction in construction time and cost are best achieved through integration, by bringing together different operators, skills, technologies and materials. The integration of architecture and engineering, for example, is already being applied in the use of emerging materials and in design models and, looking further ahead, to develop predictive models that are fit for Construction 4.0<sup>39</sup>.

Although its membership is diverse and growing, the PTPC recognises that it needs to work more closely with architectural companies as they are currently underrepresented in the membership compared to other disciplines. It is also essential to partner with more technology companies, particularly from the ICT field, as their skills will significantly help to boost the competitiveness of the broad construction sector<sup>40</sup>. It is particularly important, for example, to use ICT technologies to facilitate collaboration across the entire construction value chain.

In collaboration with the ECTP and other national construction platforms, the President of the PTPC highlights the fact that the PTPC has an important role to play in helping to influence and shape the European Digital Single Market, particularly with regards to standardisation, as well as its alignment with Portuguese policies.

**The use of digital technologies in construction requires policies to promote their use across the sector and by all types and sizes of stakeholder organisations. Digital technologies, for example Building Information Modelling (BIM), also require standardisation to guide their use.**

The President of Newton Engineering Consultants<sup>41</sup> argues that appropriate policies and standards are missing in Portugal, in spite of the international success that Portuguese companies in the architecture and engineering sub-sectors have demonstrated is possible by embracing technologies such as BIM. Large construction



companies, for example, are already comfortable working with BIM because it is a requirement in international tenders<sup>42</sup>. Large companies could also help to complement policy initiatives by actively encouraging and supporting the adoption of BIM throughout their own value chains. This would help to provide an opportunity-driven incentive for smaller companies in particular, and would help to support broader digital transformation in the sector.

There is also a need to reform the National Scientific and Technological System (SCTN) in Portugal, according to a professor at the Superior Technical Institute at the University of Lisbon (Instituto Superior Tecnico, Universidade de Lisboa). He argues that the SCTN is not currently well suited to the needs of construction companies. Reform is needed to make it less bureaucratic, to simplify the institutional framework, and to create a clear distinction between educational and research organisations<sup>43</sup>.

## 4.

## Conclusion and recommendations

In line with the ECTP, the PTPC is supporting the competitiveness and sustainability of the national construction sector, and by extension at European level, through collaboration among relevant stakeholders and the promotion of RD&I projects.

The PTPC is an ongoing initiative that has thus far been broadly successful in implementing its activities and achieving its objectives. However, there is room for improvement moving forward.

The Technology Observatory has been established to monitor construction and related market developments and to provide PTPC members with access to a construction knowledge repository. Members can login into the Observatory via the PTPC website.

The AEC Cluster has been created to promote collaborative innovation and investment in RD&I to enable current systems, products and processes to be updated.

The PTPC and the AEC Cluster are proactively influencing Portuguese RD&I agendas and construction policy-making in Portugal, as well as at European level through their collaboration with the ECTP. Domestically, for example, they are helping to shape the National Investment Plan 2030 to ensure that it addresses the needs of the AEC sector. Internationally, they have organised seven strategic forums for construction sector stakeholders which have increased their international visibility and profile, as well as enabling them to build strategic partnerships with international partners.

**The PTPC is an effective type of instrument with which to guide the growth, development and governance of the construction sector. The main strengths of the PTPC are that it is industry-led and that its membership is both diverse and inclusive of all types of stakeholders. The combination of these strengths enables the PTPC to take an**

**integrated approach to sectoral development and problem-solving.**

The PTPC does however recognise that greater involvement of architectural and ICT companies is required to ensure that the membership has the right blend and balance, particularly in an age of digital transformation. This should be a priority focus for the PTPC in the short to medium-term.

Another priority focus for the PTPC should be to promote the uptake of digital technologies by SMEs, as well as the development of a reliable digital innovation ecosystem for construction in Portugal. This focus would concur with the aims of the ECTP, as expressed by the ECTP Secretary General at the EU Industry Day 2018<sup>44</sup>.

According to its President, the PTPC recognises that relatively low levels of funding are a limitation on PTPC and member activities and their impact. It is therefore recommended that emphasis be directed towards increasing the levels of financial support available to support and boost PTPC activities.

There is also a need to improve the provision of public content on the PTPC website. The information that is available to the public on the website is fairly sparse and is not particularly up-to-date. The latest newsletter, for example, is dated 2017. In addition, on some web pages, there is either little or no content at all – for example, the news page (imprensa).

**The National Investment Plan (NIP) 2030 is a good example of how the PTPC has been successful in influencing and shaping the national policy framework to ensure that it contributes to the development of the domestic construction sector.**

The NIP 2030 recommends the roll out of 78 measures. Some examples that best reflect the mandate and objectives of the PTPC are:

1. Innovation and modernisation measures:
  - a. Promote the importance of digitalisation;

- b. Increase skills and sector growth through education, training and capacity building;
  - c. Improve certification of skills and abilities;
  - d. Develop standards, manuals and guides to inform and guide the sector;
  - e. Create a legal and normative framework that favours the transmission of open standards of communication in the sector;
  - f. Prepare public measures to encourage the adoption of digital processes;
2. Smart Cities (energy and climate change) measures:
- a. Establish funding for integrated mobility projects in partnership with the private sector;
  - b. Assess the built environment in preparation for electric and autonomous mobility;
  - c. Install fast filling stations for electric vehicles, increasing geographic coverage and network density;
  - d. Promote and support the creation of solar power stations;
  - e. Encourage the use of large infrastructure for the production of renewable electric energy;
  - f. Microgeneration in public buildings;
  - g. Creation of legislation that defines Mandatory Minimum Instrumentation in new or rehabilitated infrastructure works;
  - h. A range of specific mobility measures including, for example, systems integration to improve vehicle mobility, installation of monitoring sensors in urban environments, establish access points to information on

construction and other factors to facilitate mobility planning, create inter-municipal data platforms to aggregate and share mobility information, and integrate collaborative technologies and services in the field of mobility<sup>45</sup>.

Overall, the **PTPC is considered to be a 4-star good practice measure**, using a scale of 1 (low) to 5 (high) stars. This measure falls just short of the highest score, at present. It has put in place the necessary mechanisms to enable it to deliver on its objectives, and it has been broadly successful in achieving those aims. However, the PTPC faces considerable challenges ahead. It will need to involve and work closely with more architects and in particular with ICT companies. Collaboration with these types of companies is key to addressing the digital challenge facing the construction sector, and especially the large proportion of smaller businesses.

**The PTPC experience and lessons learned are considered to be highly transferable, with a score of 5 stars**, to countries that have not yet established a similar type of multi-stakeholder construction sector forum and platform. As one of many technology platforms across Europe, the concept and approach has been tested in a number of countries and sectors. The key is to create a community of members that is broad, diverse and fully representative of the target industry, and to bring them together to work collaboratively towards a common set of objectives.

# Endnotes

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- 2 European Construction Technology Platform (ECTP):  
<http://www.ectp.org/>
- 3 The term 'built environment' refers to the human-made aspects of our surroundings, as opposed to the natural environment. It includes all forms of buildings, the urban and landscaped spaces between and around buildings (e.g. parks), and all civil engineering infrastructure.
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