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INDUSTRY 4.0 FOR SUSTAINABLE PUBLIC PROCUREMENT

DATA AS THE NEXUS BETWEEN DIGITALISATION AND SUSTAINABILITY IN PUBLIC PROCUREMENT

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Summary

This research aims to link the concepts of public procurement, sustainability and digitalisation and to explore whether digitalisation (specifically artificial intelligence and data monitoring) can contribute to the uptake of sustainability in public procurement and if so, how this can be done. This research aims to fulfil a difficult goal and to tackle a new, almost unexplored field of research. The main research question that this research tackles is: Can digitalisation (particularly AI and data monitoring) contribute to the uptake of sustainability in the public procurement process and if so, how?

To answer this question, it first explores the current state of sustainability in EU public procurement, its main limitations, as well as its potential links to digitalisation. How can public buyers integrate sustainability in PP? In the EU, they are free to incorporate green and social aspects in all stages of the procurement process, as long as these are connected to the subject-matter of the contract. This voluntary approach to sustainability in public procurement, coupled with the condition of a link to the subject-matter of the contract are generally considered the main roadblocks to a better uptake of SPP.

As opposed to the freedom of choice for contracting authorities, studies show that creating goals and mandatory requirements to integrate sustainability in public procurement leads to better results and a higher uptake of green and social considerations.[1] Recently, more and more sustainability requirements have started to penetrate public procurement – not through the Public Procurement Directive, but through sectoral legislation, which lead scholars to talk about a reform from 'voluntary to mandatory' provisions and from 'how to buy (…) [to] what to buy'.[2]

The new sectoral legislation stands out not only through its mandatory sustainability, but also through its remarkable link to digitalisation, granting this research to qualify it as an example of the 'twin transitions'. Whilst the public procurement Directive only contains voluntary

[1] See, for example: United Nations Environment Programme, '2022 Sustainable Public Procurement Global Review' (2022) 25.

[2] Willem Janssen, 'Shifting Towards Mandatory Sustainability Requirements in EU Public Procurement Law: Context, Relevance and a Typology' in Willem Janssen and Roberto Caranta (Eds), *Mandatory Sustainability Requirements in EU Public Procurement Law. Reflections on a Paradigm Shift* (Hart Publishing 2023) 4 and 8.

sustainability (with little to no mandatory sustainable public procurement) and barely any link to digitalisation, sectoral legislation does the opposite. It mandates public buyers to buy sustainable and to use digital tools in tracking their efforts, mainly data monitoring tools. Data monitoring could track if mandatory obligations are met and render a realistic and useful image of green and social public procurement in the EU and Member States.

Secondly, this research explores the state of play regarding public procurement and digitalisation. Emerging technologies have been at the forefront of policy, research, and general society agendas, confirmed by multiple EU policies and legislations. The private sector has largely experimented with different technologies, some of them becoming world-wide phenomena, such as cryptocurrencies and ChatGPT. Consequently, the public sector welcomed the digitalisation trend, based on the premise that it can positively contribute different dimensions of the procurement process.

Industry 4.0 was defined as the 'organisation of production processes based on technology and devices autonomously communicating with each other along the value chain in virtual computer models'.[3] Even though this concept was used in the initial design of the research project, it does not hold a fundamental place in the final form of this PhD. This term references production processes in the private sector more than public procurement processes. Rather, the term 'digitalisation' is preferred, as it fits better into the context of PP and the activity of contracting authorities. Thus, the sub-title of the thesis was added to better explain the research focus: 'Data as the nexus between digital and sustainable public procurement'.

Another conceptual dimension that needs to be clarified stands in the difference between the use of digital tools in the PP process and the PP of digital tools. Even though both concepts are important and have their relevance in legal studies, this research only explores the use of digital technologies in the public procurement process. This means the use of different digital tools (in the case of this research – specifically AI and data analysis) in the procurement practice of public buyers – how they integrate these tools when they perform the procurement function. In other

[3] EP, DG for Internal Policies, *Industry 4.0. Study for ITRE Committee* (*EP website*, 2016) <chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.europarl.europa.eu/RegData/etudes/STUD/2016/570007/IPOL_STU(2016)570007_EN.pdf> accessed 30th of April 2025 7.

words, this research only focuses on the digitalisation of the procurement process, with artificial intelligence and data analytics as chosen technologies.

Policy, literature and international reports embed two opposing perspectives on the digital public procurement, framed by this research as the revolutionary vs. moderate approaches. According to the revolutionary approach, digital technologies have a potential revolutionary role for public procurement and SPP, that can completely change the *status quo*: according to this point of view, emerging technologies have the potential to transform the entire public procurement process.[4] *The* theory of moderation argues against an immediate adoption of AI in PP and has Sanchez-Graells as main proponent.

The use of emerging technologies relies on pre-existing e-procurement systems (this evolution refers both the past and future processes): the first stage included moving from paper to e-Procurement, then by a fully digital process, while the fourth step includes/will include 'data analytics and artificial intelligence'.[5] This research supports the moderate approach, which believes that artificial intelligence should not be immediately adopted in public procurement, as its risks overturn its advantages.

In line with the literature on the theory of moderation described above, with Sanchez-Graells as main proponent, this research supports this theory and builds upon it, by recalling that digital public procurement is sequential and requires three main stages:[6]

[4] On the distinction between the two perspectives, see also: Albert Sanchez-Graells 'Digital Technologies and Public Procurement: Gatekeeping and Experimentation in Digital Public Governance' (Oxford University Press 2024) 123 and next; Commission, 'Digital procurement' (*EC Website*) <https://single-market-economy.ec.europa.eu/single-market/public-procurement/digital-procurement_en> accessed 7th of April 2025 (currently, the webpage changed, for the version used see: <https://web.archive.org/web/20241218010046/https://single-market-economy.ec.europa.eu/single-market/public-procurement/digital-procurement_en>.

[5] Petra Ferk and Boštjan Ferk, 'Article 22 Rules applicable to communication' in Caranta R and Sanchez-Graells A (Eds), *European Public Procurement: Commentary on Directive 2014/24/EU* (Edward Elgar Publishing 2021) 236, 241.

[6] Sanchez-Graells, *Digital Technologies and Public Procurement: Gatekeeping and Experimentation in Digital Public Governance* (Oxford University Press 2024) 124 and next, 176 and next, 180.

1. An e-Procurement system, capable of automatic PP data collection

2. A data infrastructure that manages the collected PP data

3. Eventually – other digital technologies, such as AI, particularly for data processing.

This research argues that data is the nexus between digital and sustainable PP: From a digital point of view, data it is a pre-condition and success factor regarding the implementation of AI (and other emerging technologies as well) – as explored in the theory of moderation from Chapter III. From an SPP point of view, data is a condition for the successful monitoring of mandatory SPP requirements and targets and generally a manner of monitoring the uptake of green and social indicators.

In this context, it explored the current state of SPP data in the EU, with the conclusion that there is a general lack of such data and there is no legal mandate to collect SPP data in the EU. In order to reach this conclusion, it critically presented the Public Procurement Data Space, the Open Data Directive, the Data Governance Act, the AI Act and the eForms. The most recent EU standard for PP data collection – the eForms – comes closest to creating a mandate, yet it fails to do so, since all of the SPP fields in the eForms are voluntary and none of them are mandatory.

The last part of the research argued that while there is a general agreement on the positive role of SPP data monitoring, there are several EU and national-level roadblocks that prevent progress. At EU level, the main issues revolve around the lack of a legal basis for SPP data monitoring and the legal contradictions between voluntary-mandatory sustainability in the Directive vs. sectoral legislation, the lack of correlation of the mandatory sectoral obligations with the voluntary eForms, the lack of an EU definition of what is green and what is social, the confusion between SPP outputs and SPP outcomes (and generally ignoring outcomes), no real consequence if mandatory monitoring is not implemented.

At Member State level, the issues are more complex and mainly refer to the considerable distinctions between Member States when it comes to SPP strategies, requirements, targets, definitions, object of monitoring (Outputs / Outcomes / Institutionalisation / Combination of the three), monitoring systems, as well as the important differences in results (SPP uptake, SPP reporting, SPP reporting thresholds, different degrees of greenwashing and openwashing).

In order to overcome these challenges, the chapter builds a multi-layered solution system, both at EU and national level. At EU level, the research proposes the immediate solution of updating the eForms with mandatory SPP from sectoral legislation. When it comes to solutions that should be implemented gradually, after the reform of the PP Directives, this research argues that all SPP fields in the eForms should be mandatory and that all of the SPP-related requirements should be grouped in one legal source.

At Member State level, the main proposals from this chapter were to stimulate the adoption of SPP and SPP monitoring policies in each country and in order to build the infrastructure to create a national procurement data management office (PPDMO), as well as to develop the professionalisation of public servants.

The proposed solutions wish to advance the SPP monitoring framework in the EU, yet not fall into idealised solutions, that ignore the existing legal, political and infrastructural challenges. The solutions aim to balance the issues and the potential benefits, in a pragmatic, specific and nuanced manner, that takes into consideration the reality of PP practice.

Keywords: sustainable public procurement, digital public procurement, artificial intelligence, data monitoring, sustainable public procurement data

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