New Trends in 3D Cadastre Research

- A literature survey

11 October 2021

Jesper M. Paasch
Aalborg University, Denmark
University of Gävle, Sweden

Jenny Paulsson
KTH Royal Institute of Technology, Sweden

7th International FIG Workshop on 3D Cadastres
11-13 October 2021, New York, USA

Based on the analysis of
530
3D cadastre publications 2012-2020

Article

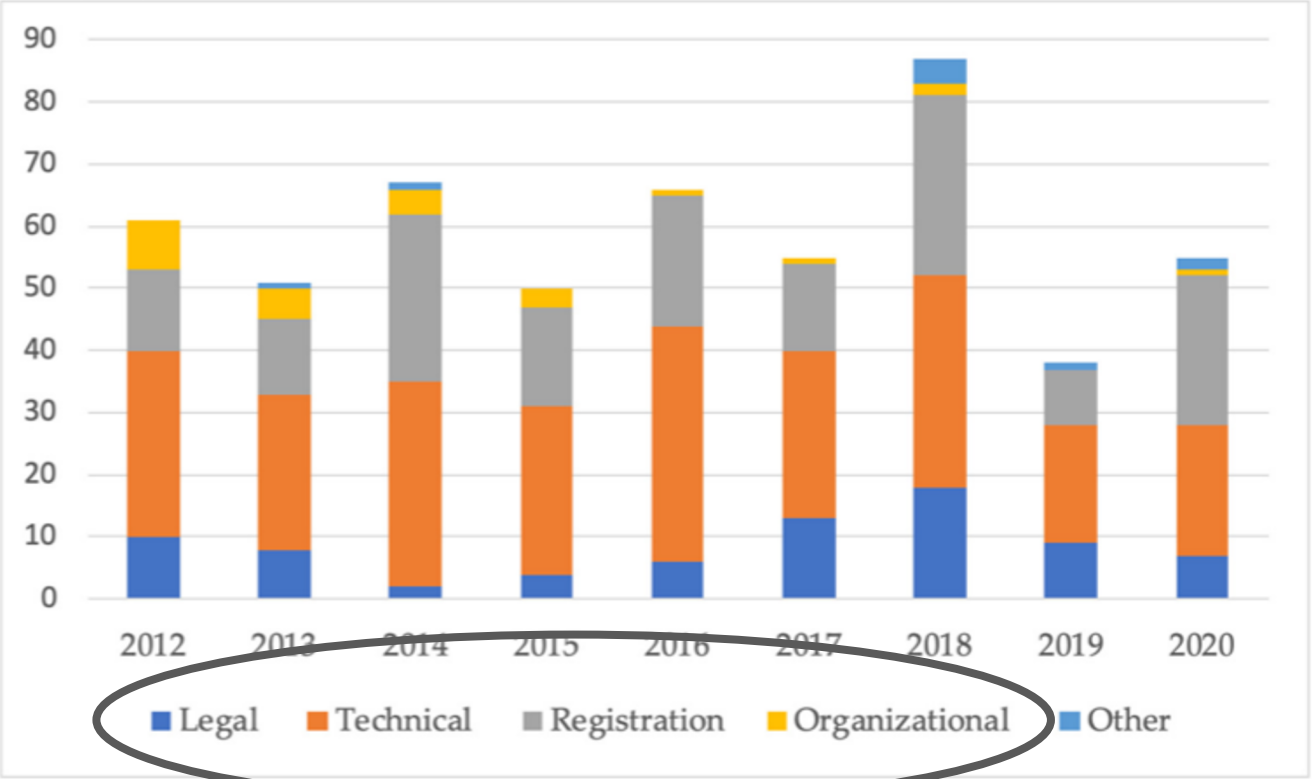
3D Property Research from a Legal Perspective Revisited

Jesper M. Paasch [1,2,*] and Jenny Paulsson [3]

[1] Department of Computer and Geospatial Sciences, University of Gävle, SE-80176 Gävle, Sweden
[2] Department of Planning, Sweden/Aalborg University, DK-2450 Copenhagen SV, Denmark
[3] Division of Real Estate Planning and Land Law, KTH Royal Institute of Technology, SE-10044 Stockholm, Sweden; jenny.paulsson@abe.kth.se
* Correspondence: jesper.paasch@hig.se

Abstract: The concept of 3D cadastre is widespread internationally and part of many nations' legal infrastructure. Since the publication of a literature survey on 3D cadastre research by Paulsson and Paasch in 2013, there has been a considerable amount of research output and activities in regard to 3D cadastre, which led us to believe that a new investigation of 3D cadastre publications could be of interest. The aim of this study is to analyze the development in 3D cadastre research during the

Paasch and Paulsson (2021)



Focussing on *Legal, Technical, Registration* and *Organizational* topics.
Paasch and Paulsson (2021)

A very similar distribution as shown in our analysis covering 3D cadastre publications 2001-2011. Based on 159 publications.

What is new?

(Paulsson and Paasch, 2013)

Computers, Environment and Urban Systems 40 (2013) 7–13

Contents lists available at SciVerse ScienceDirect

Computers, Environment and Urban Systems

journal homepage: www.elsevier.com/locate/compenvurbsys

3D property research from a legal perspective

Jenny Paulsson [a,1], Jesper M. Paasch [b,*]

Additional analysis have identified four other subtopics 2012-2020:

BIM	**22 publications**
4D cadastre	**11 publications**
Marine and water	**11 publications**
Valuation	**8 publications**

BIM

A process for generation and management of digital representations of physical (and e.g. legal and other functional) characteristics of geographic objects

Based on digital information being collected and maintained by numerous stakeholders during the project lifecycle

BIM examples

- use of BIM as a tool for property formation, registration and visualization of cadastral information
- strategic lessons learned on 3D enabled urban land administration from a BIM initiative
- comparison of three types of BIM-based models for managing 3D ownership interests
- use of open BIM standards to source legal spaces for a 3D cadastre
- BIM-enabled spatial queries for retrieving property boundaries

4D cadastre

Development of the concept of 3D cadastre by adding a time element

4D cadastre examples

- implementation of the concept of 4D cadastre for land disputes and natural disasters
- implementation of a data schema for 4D/5D cadastre
- data and implementation issues from conventional systems to multipurpose 3D and 4D cadastral systems
- conformity of LADM for modeling 3D/4D cadastre situations
- implementation of an LADM versioned object class for representing spatio-temporal 4D objects

Marine and water

Different issues that affect the construction of a 3D LADM compliant marine and water cadastre, such as legal and technical aspects, as well as developing an institutional framework and administration system

Marine and water examples

- synchronisation of the Land Register databases with the water cadastre databases
- 3D cadastre as a tool for water bodies account
- modelling of legal land objects for water bodies in the context of 4D cadastre
- development of LADM-based marine cadastres
- organize the RRRs included in marine space and to develop a marine administration model

Valuation

The use of 3D cadastral data for real estate valuation

The data sources and geospatial analyses can be used to visualize value spatial distribution

Valuation examples

- possibilities of mass real estate valuation based on a 3D Vector Terrain Model created from the digital cadastral map
- the role of semantically rich 3D building models and 3D cadastres in relation to valuation and taxation
- development of valuation approaches in relation to cadastres
- why and how the 3D CityGML modelling standard can be used in real estate valuation and transaction applications
- use of 3D data for better property value estimation in the context of the LADM Valuation Information Model and to develop 3D valuation unit profiles

Some nations more in focus than others

For example:
BIM – E.g. Australia, the Netherlands, Korea, Sweden

4D – E.g. Croatia, Germany, Turkey, Indonesia

Marine and water – E.g. Trinidad and Tobago, Greece, Argentina

Valuation – E.g. The Netherlands, Germany, Turkey, USA, United Kingdom

There seems to be an increased interest for the presented themes, but it is too early to conclude whether they are:

trends in 3D cadastre research

or

only express temporary interests

Can we talk about new trends or even the “3D cadastre topic” anymore?

Thank you!

Questions?

jmp@plan.aau.dk / jesper.paasch@hig.se

jenny.paulsson@abe.kth.se