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Chaos and black boxes – barriers to traceability of construction materials



Jardar Lohne, NTNU
Dept of Civil and Environmental
Engineering, NTNU



Knud Mohn, NTNU
Dept of Manufacturing and Civil
Engineering, NTNU





- 45 years of all-round experience in leading positions within the construction industry to public and private organisations
- Engaged at NTNU (Dept. of Manufacturing and Civil Engineering) from 2020
- 16 years a member of the CEO-staff in NDEA (Norwegian Defence Estates Agency)
- Participated in R&D in ICT, both in EU projects and national projects in the fields of Health, Trade procurement and Construction industry together with NDEA, DnV and SINTEF.
- Project manager for the winning team in the World Championship in BIM 2007
- Winner of Rosing price “Green ICT” in 2010
- Worked within sustainability since 2011 related to sustainability goals of the UN
- Participated in all standardisation work, which deals with the digitalisation of the construction industry (such as the development of ISO 19650-series and CEN/TC 442) since 2005
- Developed the BIM study program to implement the ISO 19650-series at NTNU together with Bjoern Godager.

KNUD MOHN, NTNU 1974
Msc and Industrial economist

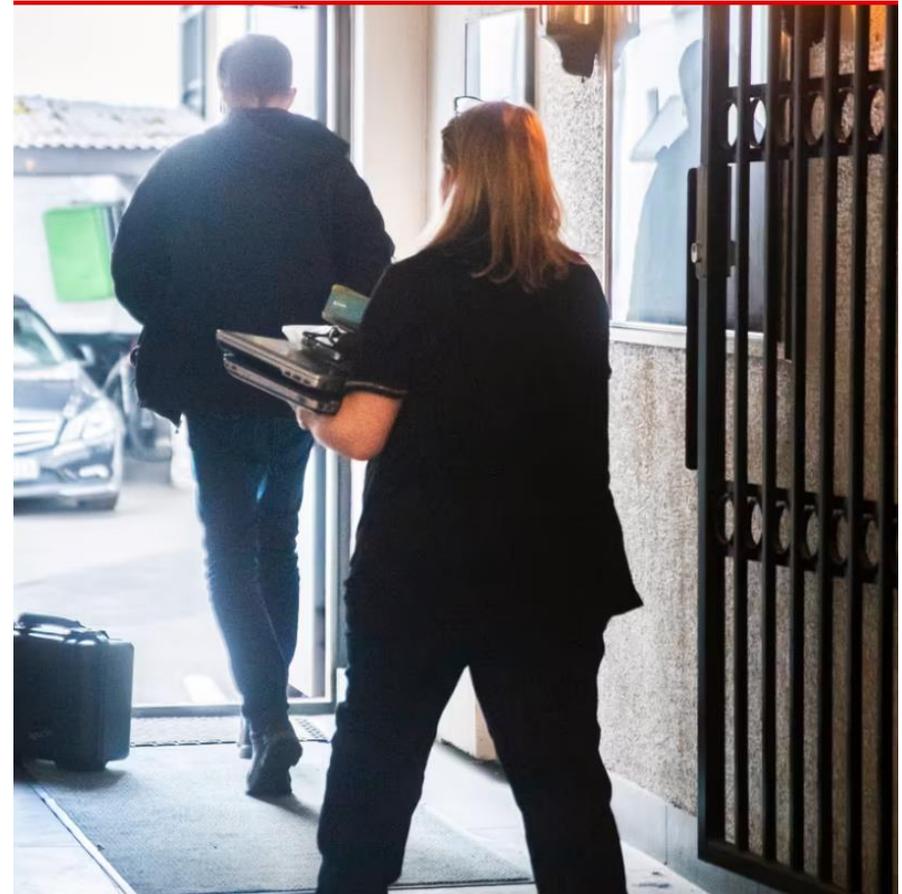
Nowadays he’s writing a series of papers together with Jardar Lohne (Dept of Civil and Environmental Engineering, NTNU) about the possible reasons why the construction industry in Norway does not have sufficient progress in its transmission to a sustainable and a digitized service industry.

Background



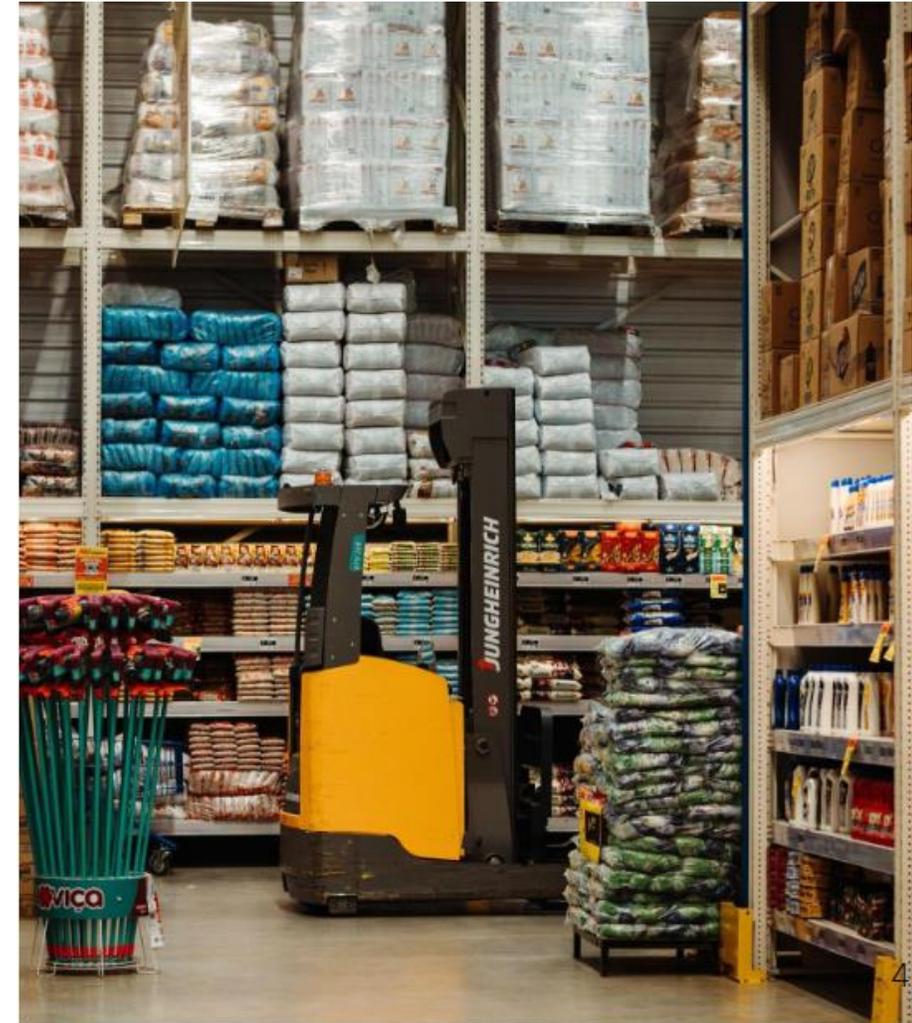
Surprisingly little work seems to have been carried out about how the performance of the materials value chain influence the potential for criminal or unethical practices in the industry.

The analysis addresses several of the UN sustainable development goals, such as goal 8 (“Decent Work and Economic Growth”, in particular 8.4, “Improve resource efficiency in consumption and production”) goal 9 (“Industry, innovation and infrastructure”, in particular 9.5 “Enhance research and upgrade industrial technologies”), 16 (“Peace, justice and strong institutions”, in particular 16.5 “Substantially reduce corruption and bribery” and 17 Collaborate).



Scope

- What is the state of the art of materials traceability within the construction industry today
- What are the main challenges to traceability within the construction industry materials supply chains today?
- What main avenues can be envisaged for addressing the challenges identified?



Methods

1. Literature review

2. In-depth interviews have been conducted with 22 key actors in various industries



Interviewee	Position	Size of organisation	Industry (services)	Industry (construction)	Years of practice
1	senior management	large	food		20-25
2	senior management	small	IT		25-30
3	middle management	small	food		30+
4	senior management	large	purchase		30+
5	senior management	large	IT-(R&D)	Oil&gas	20-25
6	senior management	large	R&D	construction	30+
7	senior management	large		purchase	30+
8	middle management	medium	IT-(R&D)	construction	20-25
9	middle management	medium	IT purchase	construction	30+
10	senior management	large	IT-(R&D)	Oil&gas/health	30+
11	senior management	large		contractor	25-30
12	middle management	Large		purchase	25-30
13	senior management	medium	IT	Databases	20-25
14	operation managem..	large	logitic	contractor	10-20,
15	senior management	medium		services	30+
16	middle management	large	IT-R&D)	Oil&gas	25-30
17	senior management	medium	services	construction	30+
18	senior management	medium	services	construction	30+
19	middle management	small	developer	construction	10-20.
20	middle management	large	purchase	construction	20-30
21	middle management	medium	EDI	construction	20-30
22	middle management	large	Sertification	construction	10-20.



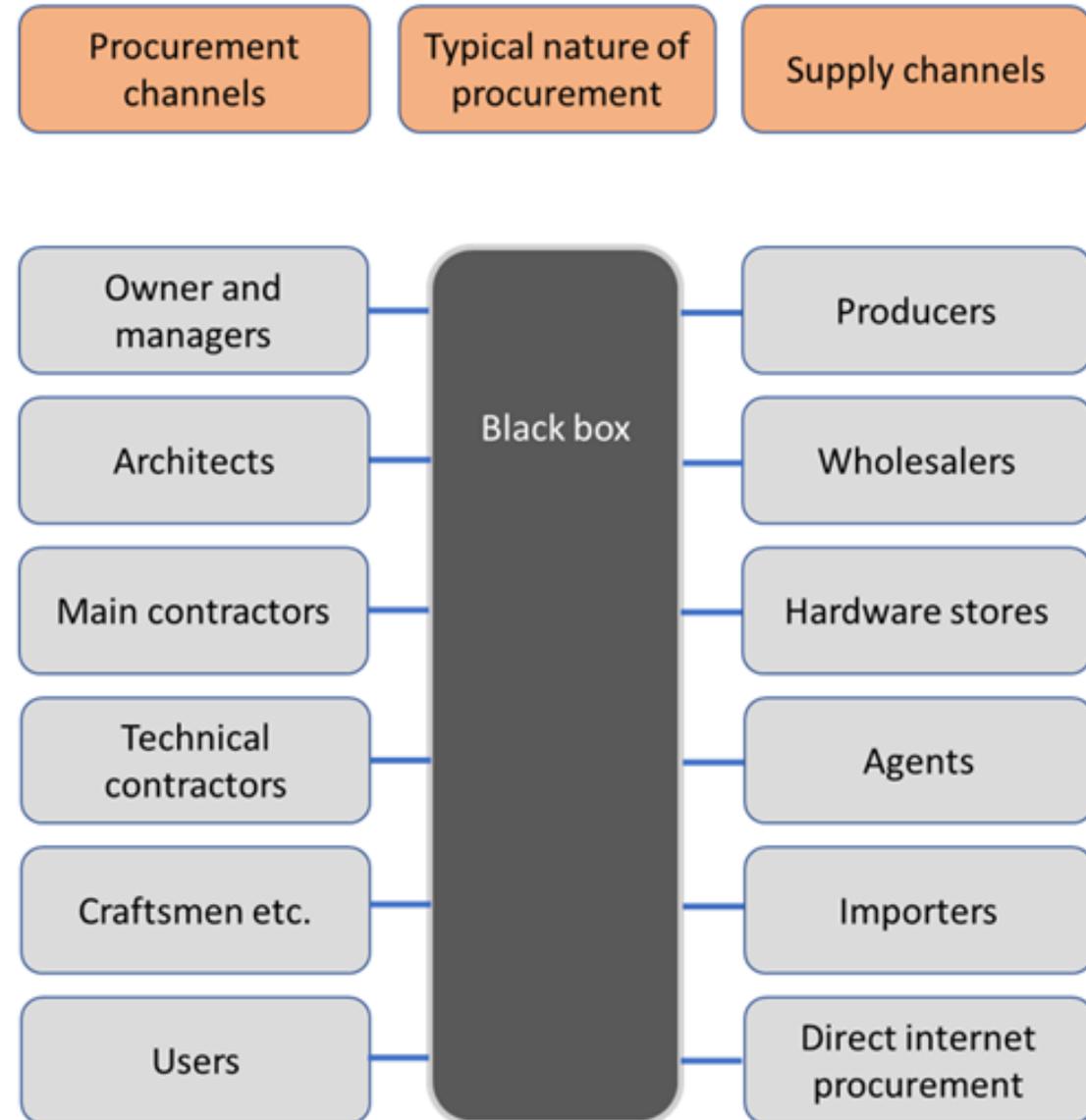
Results

The black box:

Figural representation of the main challenges

Many of actors on the left side are working in parallel and often with repeated bidding round.

This has become a problem for the supply channels, and also lead to increased prices.





Findings with some of them

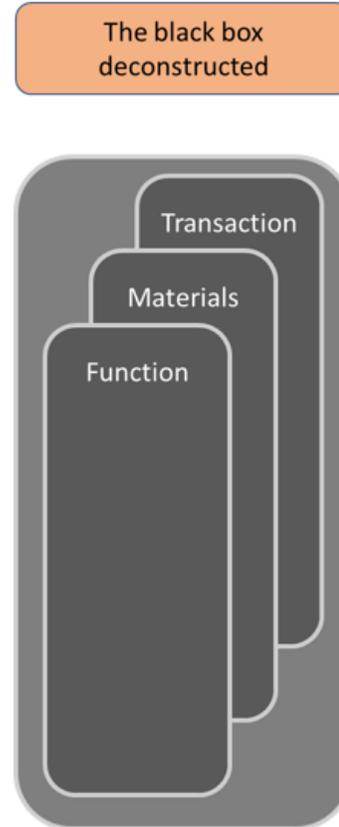
- **About 35% of deliveries** to the construction site don't have reception checks from the executors
- **Tracking of built-in products** is nearly non-existent. (GTIN is only used in ordering)
- **Only about 7% of e-commerce** is linked to the professional
- **Price is often decided upon** before product is specified
- **The trading processes consist often of parallel process** with many different actors
- **System orders** such as fire walls, climate walls are often adjusted down to partial
- **There are no legal requirements** for the identity of products used in buildings to be judged.



Discussion and conclusion

Based on the above, the challenges falling into the black box can be attacked following the deconstruction into three parts.

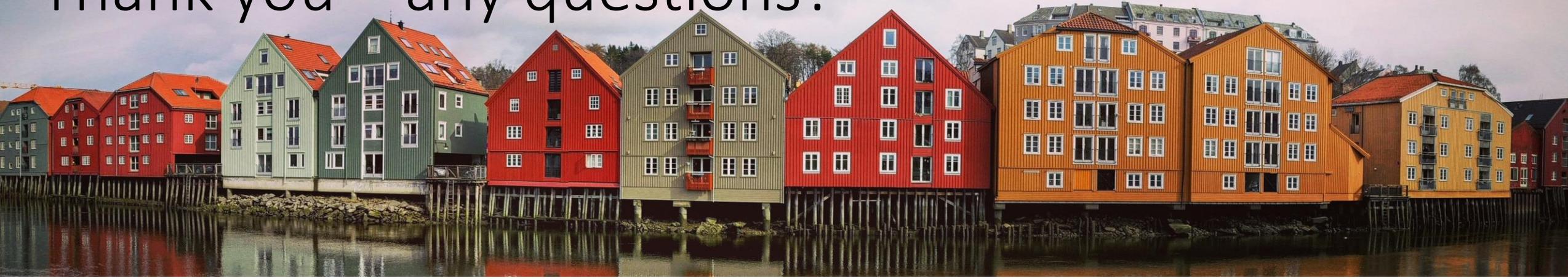
- **Firstly**, there is a need for transparency concerning the **transactions** involved.
- **Secondly**, there need to be tracability sufficient for assuring actual tracking of **materials** into the built asset.
- **Thirdly**, there needs to be sufficient control over what **functions** product assemblies fill in built assets.



Further work:

Describe and discuss how a complete digital tracking from ordering to installation of products can be carried out

Thank you – any questions?



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