Introduction

1780 – Mechanization
Industrial production based on machines powered by water and steam

1880 – Electrification
Mass-production using assembly lines

1970 – Automation
Automation using electronics and computers

2000 – Digitalization
Introduction of connected devices and data analytics

Today – Artificial intelligence
Use of big data and machine learning
Introduction

➢ What is Artificial Intelligence (AI)?

The ability of a machine to mimic intelligent human behavior, thus seeking to use human-inspired algorithms for approximating conventionally challenging problems.¹

¹ Salehi and Burgueño (2018)
The Introduction of AI in the Construction Industry and its Impact on Human Behavior

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Introduction

➢ Purpose and research questions

➢ Purpose of the study:

➢ How the construction industry can close the gap between the potential benefits and the harvested benefits of the implementation of AI.

➢ Research questions (RQ):

➢ RQ1: What are the potential benefits of implementing AI in the construction industry?

➢ RQ2: How does the construction industry harvest the benefits of AI implementation today?
Method

- Literature study
- External interviews
- Case study

Aim: Mapping already existing research on the topic.

Implementation AND Artificial AND Intelligence AND Construction
Lean AND Artificial AND Intelligence
Lean AND digitization
Artificial AND Intelligence AND Construction
Artificial AND Intelligence
Digitization AND Construction
Digitization
Organizational AND Change
Human AND Behavior
Implementation AND Process

0 200 000 400 000 600 000 800 000 1 000 000 1 200 000 1 400 000
Method

| Literature study | External interviews | Case study |

Aim: Unveil useful experiences from other industries that may be transferable to the construction industry.
Method

Aim: Obtain data from an ongoing project.

- Literature study
- External interviews
- Case study

- 17 semi—structured in-depth interviews
- Document study
Theoretical Framework

Degree of digitization

- Digital transformation (ALICE)
- Digitalization (Synchro)
- Digitization (Touchplan)
Theoretical Framework

- Digitization: Creating a digital version of analog information.
- Checklists on your mobile device instead of paper.
- Touchplan: Digital version of the Last Planner System (LPS).
Theoretical Framework

- **Digitization**
- **Digitalization**
- **Digital Transformation**

- Continuously updating your BIM.
- Synchro: 4D planning Software
Digital transformation: Integration of digital technologies in a way that the organization fundamentally change how they operate.  
- Successful implementation of AI.  
- ALICE: Artificial intelligence planning Software
Theoretical Framework

Digitization

Digitalization

Digital Transformation

12 Schedule Runs

<table>
<thead>
<tr>
<th>Duration</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>723 days</td>
<td>$112,319,287</td>
</tr>
</tbody>
</table>

*Baseline*

- 313–562 Days: $84,014,533 – 89,886,352
- Hold crane, updated columns receipts crews
  - 577–597 Days: $94,589,040 – 97,301,899
- hold crane 3,5
- triple conform
  - 426–430 Days: $130,302,101 – 102,305,601
Theoretical Framework

Digitization

Digitalization

Digital Transformation
Findings

➢ What are the potential benefits of implementing AI in the construction industry?

Technology
➢ Analyze millions of “what if” situations

Process
➢ Decision-making support

Culture
➢ Act on statistics

Increased productivity

Research question 1
Research question 2
Purpose
Findings

➢ How does the construction industry harvest the benefits of AI implementation today?
Findings

➢ How does the construction industry harvest the benefits of AI implementation today?

1. Training needs analysis
2. Training design
3. Training evaluation

Process

Successful implementation

Degree of digitization

- Digital transformation (ALICE)
- Digitalization (Synchro)
- Digitization (Touchplan)

Lack of sense of achievement and ownership

Culture

Willingness and motivation

Transparent

Technology

User-friendly

Finding

How does the construction industry harvest the benefits of AI implementation today?

Research question 1

Research question 2

Purpose

Introduction

Method

Theoretical Framework

Findings

Closure
Findings

➢ How does the construction industry harvest the benefits of AI implementation today?

- Strategy for collecting data
- Process
- Successful implementation
- Technology
- Culture
- Human-AI trust

Introduction | Method | Theoretical Framework | Findings | Closure

Findings | Research question 1 | Research question 2 | Purpose

Degree of digitization

Digital transformation (ALICE)

Digitalization (Synchro)

Digitization (Touchplan)

Sufficient amount of data

The technology itself is present

Strategy for collecting data

Successful implementation

Technology

Process

Culture

Human-AI trust
How can the construction industry close the gap between the potential benefits and the harvested benefits of the implementation of AI?
Closure

Process

Successful implementation

Technology

Culture