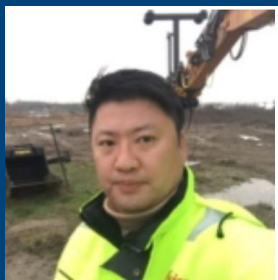




한국 총괄 본부장 한종한 | **Trimble Inc.**

토공 BIM Workflow & ECO System in Construction

_스마트건설 얼라이언스 포럼



한준한 | 한국 총괄 본부장

About me...

- 현) Trimble Inc. Field system 한국 총괄
- Leica Geosystems 건설부문 Manager _ 13년 근무
- 10년간 토목 설계 및 건설현장 근무
- 토목공학 전공

Agenda

- Trimble Inc.
- 건설현장의 필요충분조건
- 건설산업 현황 및 이슈
- 스마트 건설기술 및 디지털 데이터의 중요성
- 국외 스마트건설 현황 및 국내 스마트건설의 한계
- Digital Workflow
- Digital Platform
- Connected solution in Construction



Evolution Driven by Innovation and Experience

GPS
TECHNOLOGY



PRECISE
POSITIONING



PRODUCTIVITY
OPTIMIZATION



CONNECTED
WORKFLOW

STRATEGIC AND MANAGERIAL CONTINUITY THROUGHOUT OUR HISTORY



1978 – 1998



1999 – 2019



2020 –



Our Success is Linked to Our Customers' Success



FINANCIAL STRENGTH

\$3.6B
(매출 약 4.8조)

13.3% Revenue CAGR
from 1999–2021

NASDAQ
TRMB

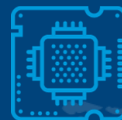


GLOBAL VISION

12,000+
임직원

Facilities in
40+ countries

150+개국 고객지원



TECHNOLOGY LEADER

R&D 센터
15 국가

\$400M+/년
R&D 투자

2,000+
특허



BUILDINGS



CIVIL ENGINEERING
& CONSTRUCTION



AGRICULTURE



TRANSPORTATION



GEOSPATIAL

건설향장의 필요충분조건



SKILLED LABOUR
SHORTAGES



COST
CERTAINTY &
OVERRUNS



SPEED OF
CONSTRUCTION &
DELAYS



PRODUCTIVITY/
QUALITY CONTROL/
CONSISTENCY



HEALTH &
SAFETY

건설산업 현황 및 이슈

Construction constitutes 13% of global GDP worldwide
...but productivity growth remains dramatically low

Process - Complex projects, generally unique

85%

Projects
Exceed
Budget

92%

Projects
Exceed
Schedule

63%

Projects
Have Quality
Deficiencies

4%

Average Profit
Margin
Construction
Firms

People - Skilled Labor is a Top Priority

90%

Face Talent
Shortages

30%

Decrease in Workers Less than
24 Years old

Technology - Investment is Low

- Low adoption of Digitalisation
- Reluctance to adopt Change
- Lack of ROI evaluation

90%

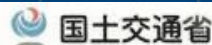
Critical to Collect Data to
Improve Project
Performance

>50%

Use Paper Forms and
Spreadsheets

일본 i-construction 1.0

i-Construction ~Improving productivity in the construction industry~



- At the Japan Government Conference on September 12, 2016, Prime Minister Abe announced a policy aimed at improving productivity at construction sites by 20% till FY2025, as part of the "Construction Site Productivity Revolution" through the Fourth Industrial Revolution.
- Toward this goal, within three years, new construction methods will be introduced at public construction sites such as bridges, tunnels, and dams, including the use of drones, etc. for surveying and connecting the entire construction process, from construction to inspection, with 3D data.

【Productivity Improvement Image】

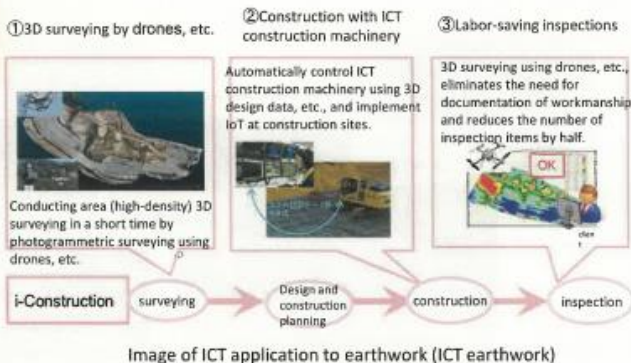
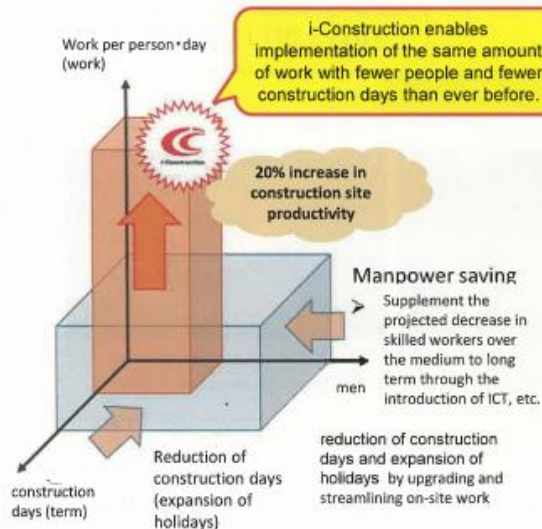


Image of ICT application to earthwork (ICT earthwork)

Key point

건설현장의 생산성 향상

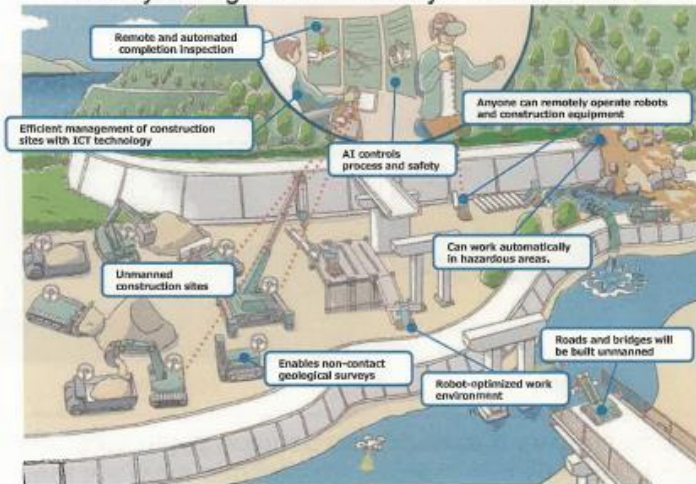
- 법령은 아니지만 추진안으로 Drive
- ICT 적용에 대한 가점 부여
- 국토교통성 -> 재무성
 - ICT 적용에 따른 비용증가
 - 3~4% 추가 산정
- 공기단축에 따른 비용절감을 해당 시공사에게 그대로 보전

일본 i-construction 2.0

i-Construction 2.0 (FY2024~) ~Automation in construction sites~ 国土交通省

- "i-Construction", an initiative to improve productivity at construction sites, is being deepened as "i-Construction 2.0" to achieve automation of construction by FY2040.
- By maximizing the use of digital technology, we will realize highly productive construction sites where fewer people can work safely and in a comfortable environment.
- We will continue to protect the infrastructure that forms the foundation of people's lives and economic activities by improving the production output and added value of each and every person working at construction sites.

Society aiming to be realized by i-Construction 2.0



i-Construction 2.0 By FY2040 with Targets to be achieved by FY2040 through i-Construction 2.0

Manpower-saving

Aim for a system that enables sustainable infrastructure development and maintenance management even in a declining population. Aim for at least 30% Manpower- savings, or 1.5 times productivity, by FY2040.

Ensure safety

Reduce fatal accidents at construction sites.

Reform of work style

Convert outdoor work to remote and off-site work.

i-Construction 2.0: Efforts toward automation of construction sites

Key point

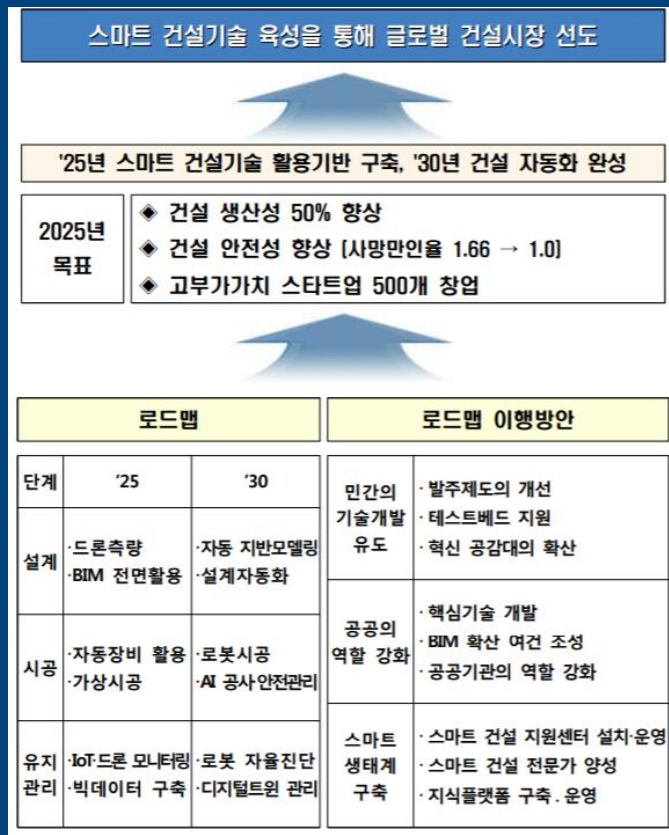
Automation 현장에서의 안전기준

후생노동성 주도

- 완전 무인화 -> 안전기준완화 추진
- Hybrid (Automation + 작업자)
- 작업자 100% 관여

(현)국내 스마트 건설 도입의 한계

- 실제 건설현장에 자동화 건설기술의 도입율은 크게 변화가 없음
- 우리는 무엇을 해왔는가?
 - 로드맵
 - 정책
 - 연구 및 개발
 - 자동화 건설 기계 실증사업
- 현재 결론 도출
 - 자동화 건설 기술이 생산성, 원가, 공기, 안전 등에 많은 향상을 가져온 다는것을 인지
 - MG/MC 품셈 개발, 시방서 제작 등의 결과가 도출
- 왜 BIM 인가?



BIM 디지털 데이터의 중요성

Real Time Digital Data is what matters

Why Real-Time Information and Data is important for Construction ?

Improves the decision-making and problem-solving strategy

This results in

Increased employee productivity
Less spending
Faster and better communication
Higher accuracy

Trimble Solutions provide it all!

Return on Investments is in your Interest

30%

Reduction in Errors
and Clashes with
Augmented Reality

Free up Capital by

5-15%

Allocating Money to
Value Add Projects

90%

Decrease In Time
Measuring and
Processing Site Data

10%

Improvement in
Project Schedule

80%

Reduction in Rework

5%

Increase in
Material Savings

50%

Increase in
Productivity of Field
Tasks

5%

Increase in Accuracy
of Estimates

30%

Reduction in
Operations and
Maintenance

Digital Workflow

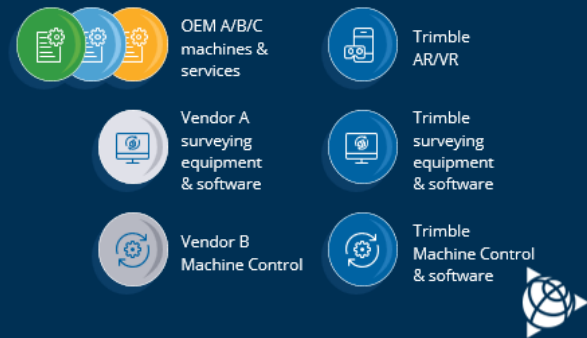
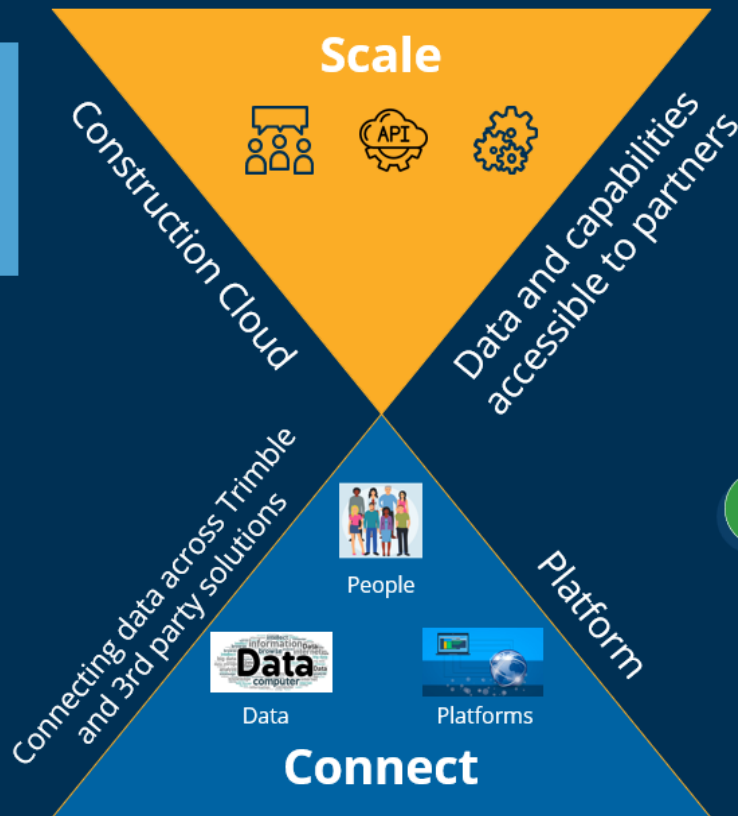
Construction cloud and platform

Construction cloud:

Aimed to connecting workflows, people, data and platform in (civil) construction industry

Platform:

A set of capabilities, workflows, common data environments and APIs enabling Construction Cloud co developed with Microsoft



From Product-led to Platform-enabled

Connected Products

- Individual users/personas
- Hard to scale customer segment
- Lack of data accessibility and collaboration

Customer
focus



- Duplication of effort
- Longer time to market and high maintenance cost
- Isolated people incentives

Execution
focus



Platform enabled

- Connected networks of users
- Multiple addressable market segments
- Accessible and interoperable data
- Reduced risk for R&D investment
- Enables automation of routine tasks
- Harmonized stakeholder incentives



TRIMBLE CONNECTED CONSTRUCTION

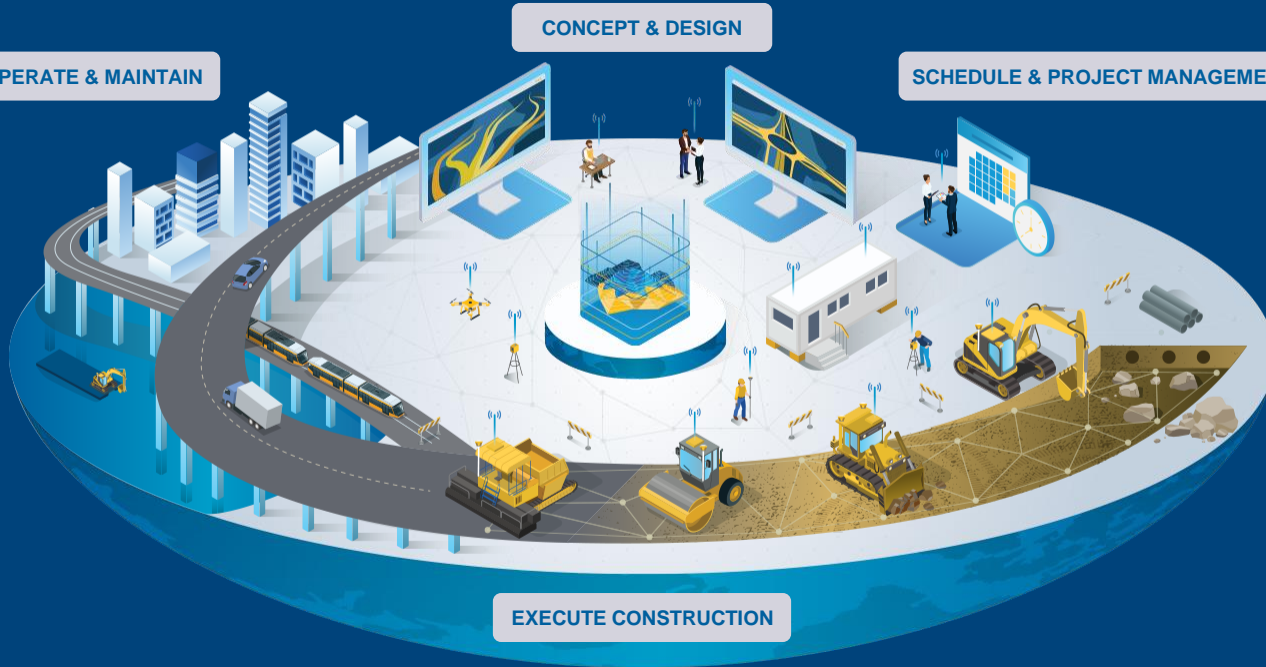
Tap the area you want to explore

OWN, OPERATE & MAINTAIN

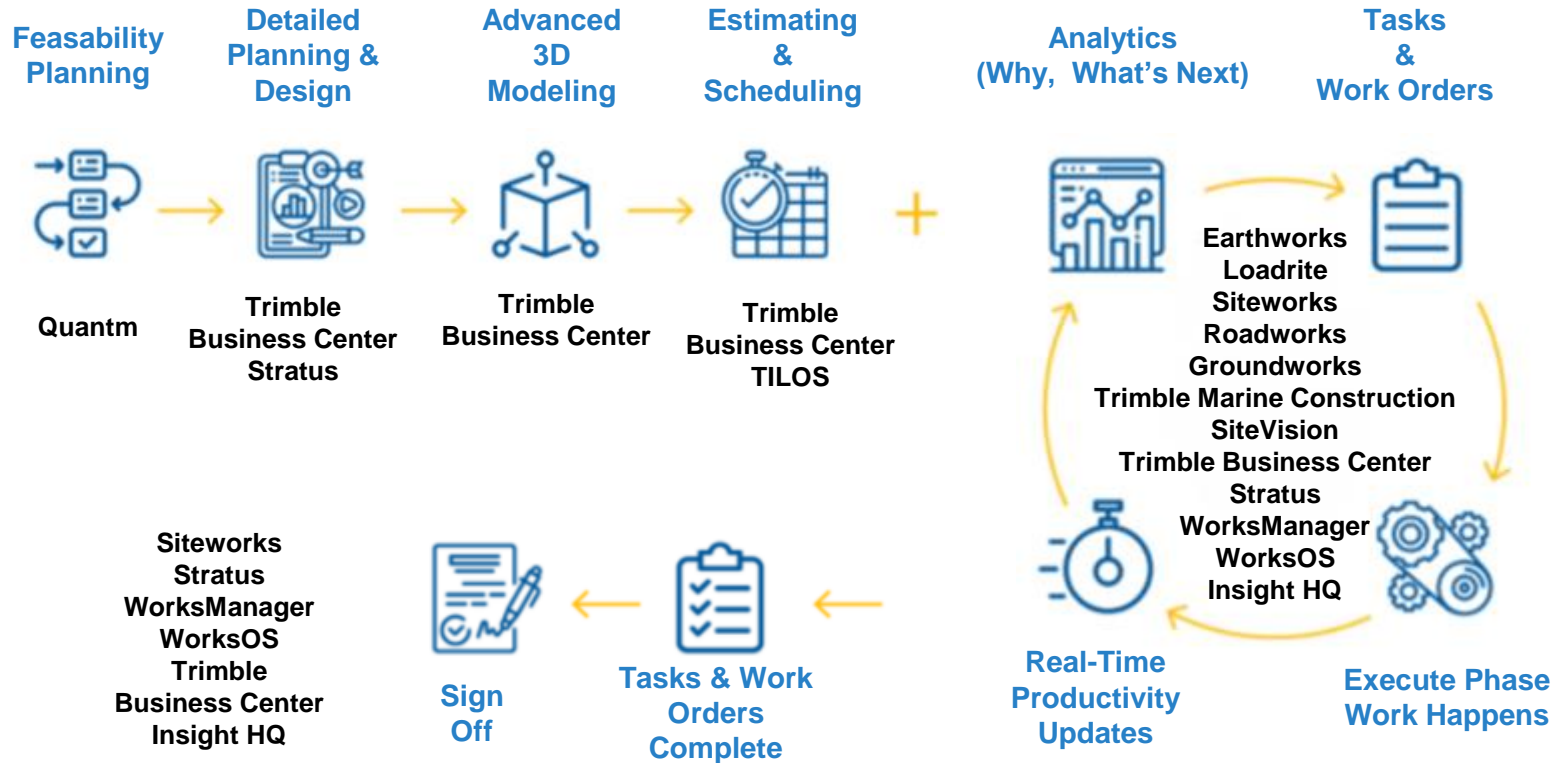
CONCEPT & DESIGN

SCHEDULE & PROJECT MANAGEMENT

EXECUTE CONSTRUCTION



Trimble Connected Construction Solutions

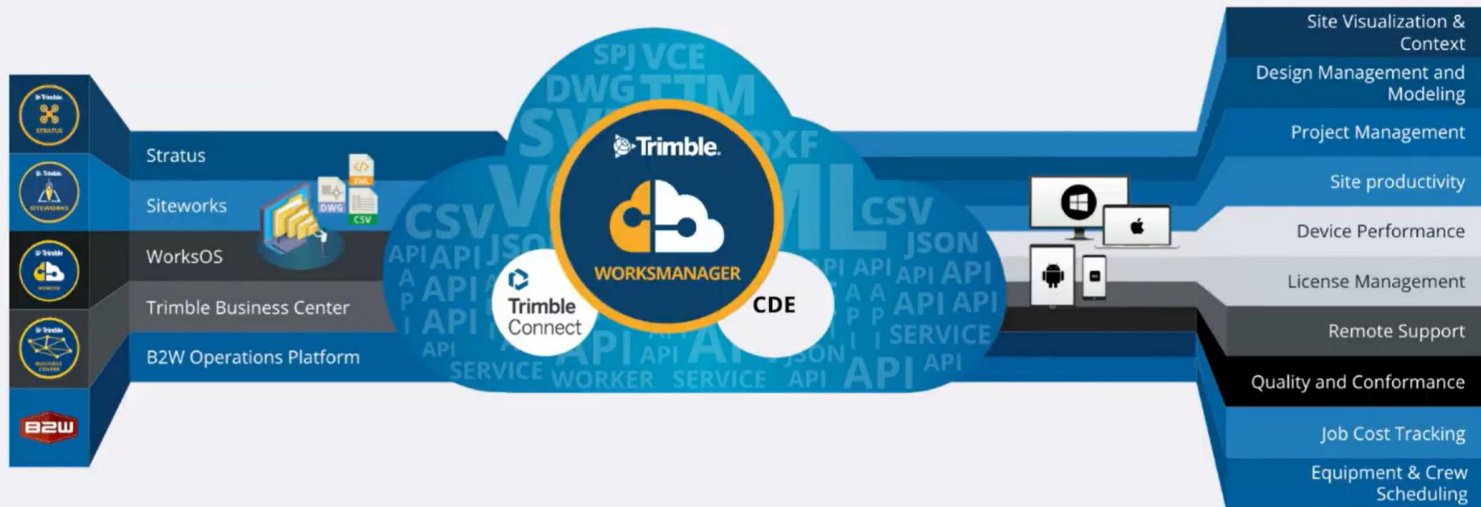


Digital Platform

From Products to Capabilities

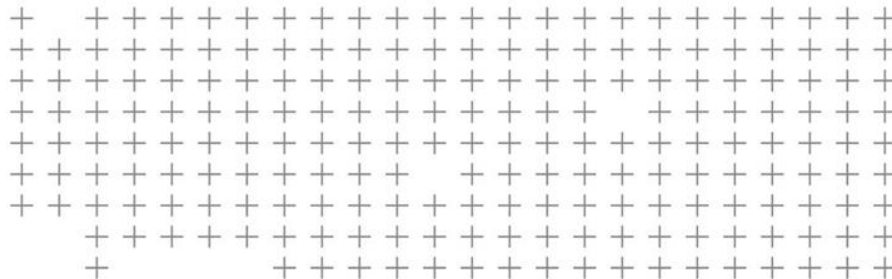
Products Today

Tomorrow's Capabilities



Connected solution Use case _ Road construction





Questions?

Thank You

감사합니다
GRAZIE VINAKA
TERIMA KASIH
THANK
YOU
TAKK
merci
謝謝
ありがとう