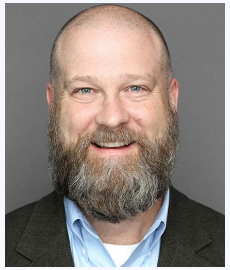


Construction Project Planning and Scheduling in Higher Education Using NetPoint and GPM

Gerald P. (Jerry) Klanac
Dr. Ahmad Hadavi
Tim McManus

Educational Panel

Moderator



Eric Lowther, PMP, LEED AP
Executive Director, PMA Consultants

Panelists



Gerald P. (Jerry) Klanac
Consultant Emeritus, PMA Consultants
Faculty of Practice, University of Dayton



Dr. Ahmad Hadavi
Clinical Professor, Northwestern University



Tim McManus
Adjunct Associate Professor
Columbia University

University of Dayton



Gerald P. (Jerry) Klanac

Gerald P. (Jerry) Klanac

Consultant Emeritus, PMA Consultants
Faculty of Practice, University of Dayton

Mr. Klanac is a consultant emeritus within PMA Consultants who has been practicing quantitative risk analysis for more than two decades. He brings unique knowledge and experience to the classroom as faculty of practice/Director of the Construction Engineering and Management program at the University of Dayton. Mr. Klanac has significant project management experience on US and international construction projects.

Known to his students as *Professor Uncle Jerry*



Jerry Klanac's Journey



Cost/Schedule Engineer with Exxon Research & Engineering

Acquires MBA at University of Chicago

Over three decades of project management consulting with PMA

Launching CEM studies at University of Dayton

Exxon

Project Cost Control Engineer on 2 successful UK Projects

MBA

Studied Business Statistics

PMA

Led PMA's Oil & Gas and Risk Practices

UD

In 3rd year as Director of UD's CEM Program



Jerry Klanac's History of Schedule Risk Analyses

(2000 to present)

PMA's clients have created an abundance of risk assessment experiences in projects of all shapes and sizes and all over the globe.

For some clients, we developed cost and schedule forecasts that were deemed to be "uncannily accurate".

COURSES DEVELOPED & DELIVERED



University of Dayton School of Engineering

	Cost Estimating	Planning & Scheduling	Project Management	Construction Management	Risk Management	Contracts	Engineering Economics
CEE 421: Construction Engineering	✓	✓		✓		✓	✓
CEE 514: Design & Construction Project Management	✓	✓	✓		✓	✓	✓
CEE 516: Management of Field Operations		✓		✓			
CEE 517: Management of Construction Organization				✓			
CEE 518: Procurement & Contract Management						✓	
CEE 519: Risk Management for Construction Projects	✓	✓	✓		✓		

CEE 519

Risk Management for Construction Projects

Technical Elective Course in University of Dayton's Civil Engineering Curriculum – Available to Undergraduate & Graduate Students

Launched in Spring 2022 Term, CEE 591 is a popular elective among civil engineering students. In 2022, there were 23 students. In 2023, there are 41 students.



01. Risk Management Process & Planning

Students discover appropriate processes for managing risks on a project and importance of planning for dealing with risks

02. Risk Identification & Prioritization

Various techniques for risk identification are discussed and used in the classroom. Case study to initially develop a risk register

03. Quantitative Risk Assessments

Techniques to conduct cost and schedule risk analyses are used in the classroom. Students get "hands-on" use of Palisades @Risk and PMA Technologies NetPoint and NetRisk in case study assignments.

04. Monitoring & Control of Risks

Last part of the class discusses the project team's ongoing efforts to monitor and control risks, using the Risk Register as focal point to share information on state of active risks.

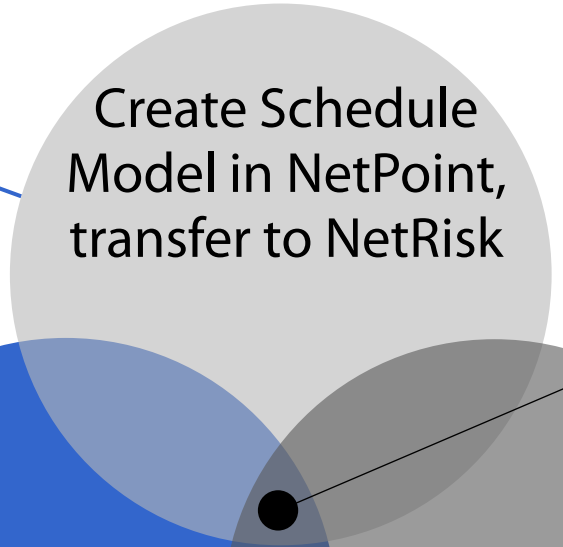
CEE 519 SCHEDULE RISK CASE STUDY

High-Performance Computing Center Project in Houston, Texas



Model Building
Students extract key sequences from a base CPM schedule and build a 40+ activity model in NetPoint





Students have to interpret simulation results to forecast timing for "Move In"

Schedule Review
Base schedule was not perfect, thus students have to adapt





Simulation
NetRisk is used to perform Monte Carlo simulation of schedule uncertainty, risk and float use.

Student Feedback: Spring 2022



"The case studies in this class helped bring the material from the lectures into practice and was a great way to apply and reinstate the material."

"What did I like best? NetPoint and NetRisk software"

"Classes devoted to going through the software and the explanation of the outputs were very helpful in understanding the course material."

"Awesome class. I really did not know much about risk analysis, but I am interested in my future career in exploring it"



Northwestern University



Dr. Ahmad Hadavi

Dr. Ahmad Hadavi

Clinical Professor
Northwestern University

Dr. Ahmad Hadavi is a Clinical Professor at the McCormick School of Engineering and Applied Science and Deputy Director of the Master of Project Management program. For his project scheduling and cost engineering & control courses, Dr. Hadavi developed his own Professional Project Management Fundamentals curriculum using Oracle Primavera P6 and NetPoint. In addition to mentoring his students to succeed in these traditional areas, Dr. Hadavi has initiated new courses in lean construction, VR/AR for design and construction, and disruptive technologies in the Architecture, Engineering, and Construction (AEC) industry.





Dr. Ahmad Hadavi

Clinical Professor
Northwestern University

Dr. Hadavi - Academia

Northwestern University

Northwestern University,
Civil Engineering

Courses Taught

CIV_ENV 336 Project Scheduling

CIV_ENV 435 Cost Engineering and Control

Research Interests

Lean Construction; VR/AR/MR in AEC; Metaverse, Construction Methods and Innovations; International Construction; Productivity Improvement; Construction Project Control.

Education

Ph.D., Northwestern University, Civil Engineering

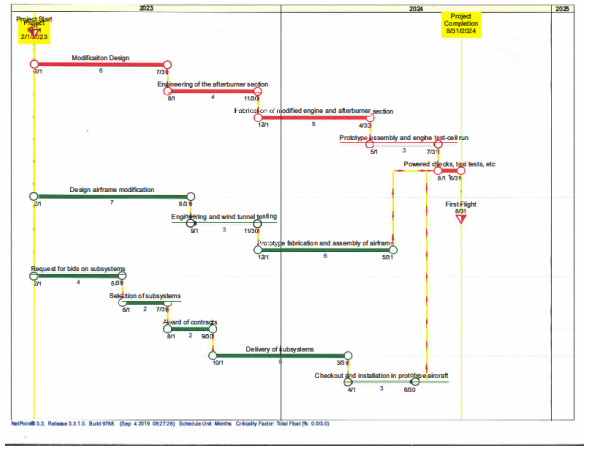
M.B.A., Harvard-affiliated Iran Center for Management Studies, Tehran, Iran

B.S., Iran University of Science and Technology, Tehran, Iran, Civil Engineering

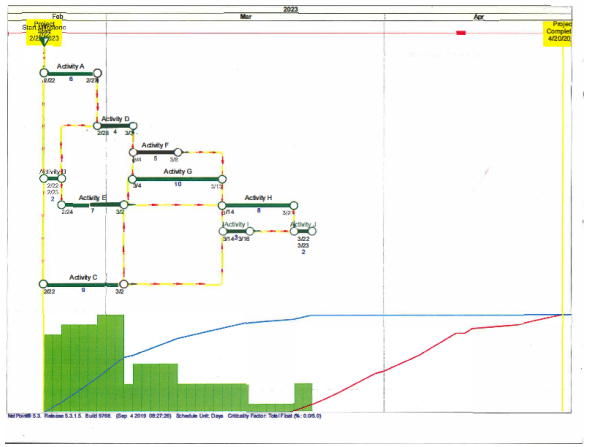


Construction Planning course from Dr. Gui Ponce de Leon

Teaching NetPoint at Northwestern University



NetPoint Assignment



NetPoint Assignment for Resource Loading

Innovations in Teaching & Research



INNOVATIONS

- Using Artificial Intelligence (AI) in scheduling
  - 4D Scheduling +AI
  - ALICE Technologies
- Last Planner Scheduling
  - Nialli, TouchPlan, Refine My Site
- Touchscreen Modes

Construction Industry Input



American Association of Cost Engineering International

- Illinois Chapter

American Society of Civil Engineers

- Illinois Section

Scheduling specifications from different agencies

Courses Developed & Delivered



CIV_ENV 336

Project Scheduling

The primary course objectives are to teach theoretical concepts and practical techniques for planning and scheduling of construction projects and to provide students with the ability to prepare a comprehensive schedule for a project, including bar charts, network diagrams, resource profiles, and time contingency analysis.

Launched in [add] Term, CIV-ENV 336 is a popular elective among civil engineering students. In 2022, there were 23 students. In 2023, there are 41 students.

CIV_ENV 435

Cost Engineering and Control

Application of cost engineering for construction companies and projects; time and cost integration; estimating process and bid preparation; labor estimates; accounting for equipment; cost-control concepts; changes and extras; claims.

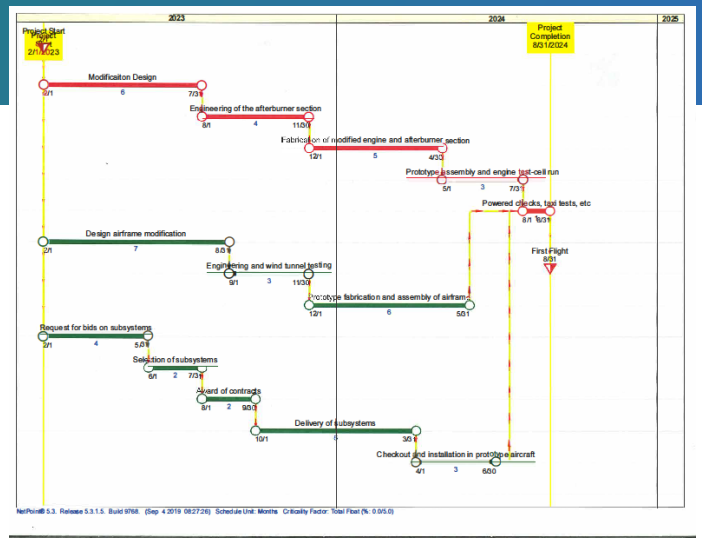
Launched in [add] 22 Term, CIV-ENV 435 is a popular elective among civil engineering students. In 2022, there were 23 students. In 2023, there are 41 students.

Teaching NetPoint at Northwestern University

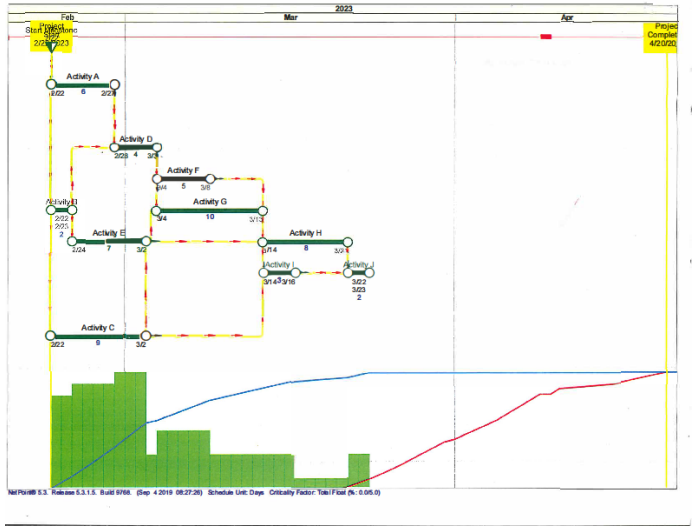


Project Details

- Create Projects
- Add Milestones and activities
- Review Critical Path
- Load Resources and Prepare Resource Histograms
- Import and Export Projects
- Two small projects 10 - 15 activities
- One large project with about 50 activities



Planning Assignment



Resource Loading Assignment

Student Feedback for NetPoint

(Students' Opinions)



Strengths

- Visually stimulating – colorful
- East to learn and to do – visual approach
- User friendly representation and interface
- Easy to drag and link - easy to read
- Convenient and useful for communication
- Straight forward - intuitive
- Showing logic - multiple activity on the same line
- Easy to understand relationships and see hanging activities
- Durations can be changed, and the impact can be seen immediately
- Global Edit feature

Limitations

- Less versatility in doing analysis
- Not suitable for a complex project with many activities
- Visual clutter
- Not an enterprise system
- Not supporting multiple open files
- Lacks preformatted reports

Columbia University



Tim McManus

Tim McManus

Adjunct Associate Professor
Columbia University

Mr. McManus is an Adjunct Associate Professor in the Department of Civil Engineering and is the Industry Advisor for the Global Leaders in Construction Management Program at Columbia University. He is a global expert and advisor to companies and governments on the planning, development, and delivery of major infrastructure, transportation, urban development, sports facilities, and capital projects and programs. He has been a Vice President at McKinsey & Company and also lectures at Northeastern University's Graduate School of Engineering, Harvard University's Graduate School of Business and the Graduate School of Design, and Massachusetts Institute of Technology.





Tim McManus

Adjunct Associate Professor
Columbia University
Industry Director – Global Leaders in Construction Management
https://www.glcm.info/

coursera

Construction Management Specialization

1. Construction Project Management
2. Construction Scheduling
3. Construction Cost Estimating and Control
4. Construction Finance
5. The Way Forward!

Total Number of Learners since 2017 reached 600,000, from 190 countries, with around 1,300 NEW learners added every week!

Tim McManus - Academia

Columbia University – Graduate School of Engineering

Managing Engineering and Construction Processes

Fundamentals of Construction

Northeastern University – Graduate School of Engineering

Alternative Delivery Methods

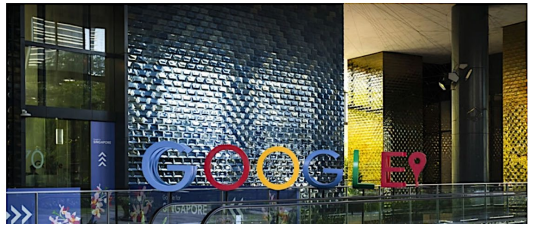
Harvard University – Graduate School of Design: Exec Ed Program

Global Infrastructure Development

COLUMBIA | ENGINEERING
The Fu Foundation School of Engineering and Applied Science

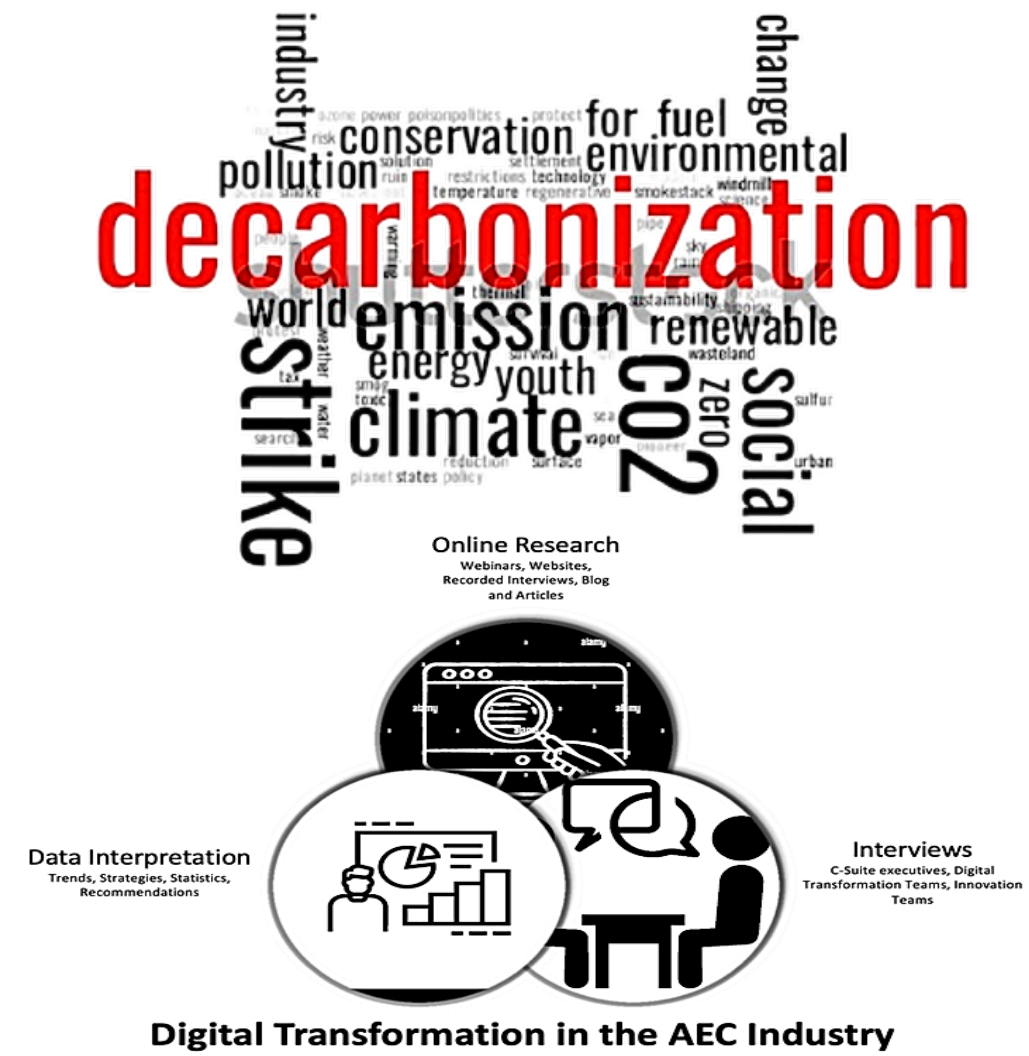
'A tipping point for higher ed': Google launches new, low-cost online programs for high-demand jobs

BY SYDNEY LAKE
October 13, 2022, 9:15 AM



Global Leaders in Construction Management (GLCM)

Turner & Townsend
AECOM
Smart City Works
Gilbane Building Company
STV 100 Years
SKANSKA
大成 DENTONS
VERTEX
McKinsey&Company





Basic Adaptability Cycle



❖ A City is adaptable and resilient if it can absorb shocks such as physical attacks, and is able to maintain Smooth flow of its regular day to day activities involving its residents, utilities and services.

The four main competencies shown in the adaptability cycle need to address the following four main socio-technical dimensions of every city:

- Physical
- Information
- Cognitive
- Social

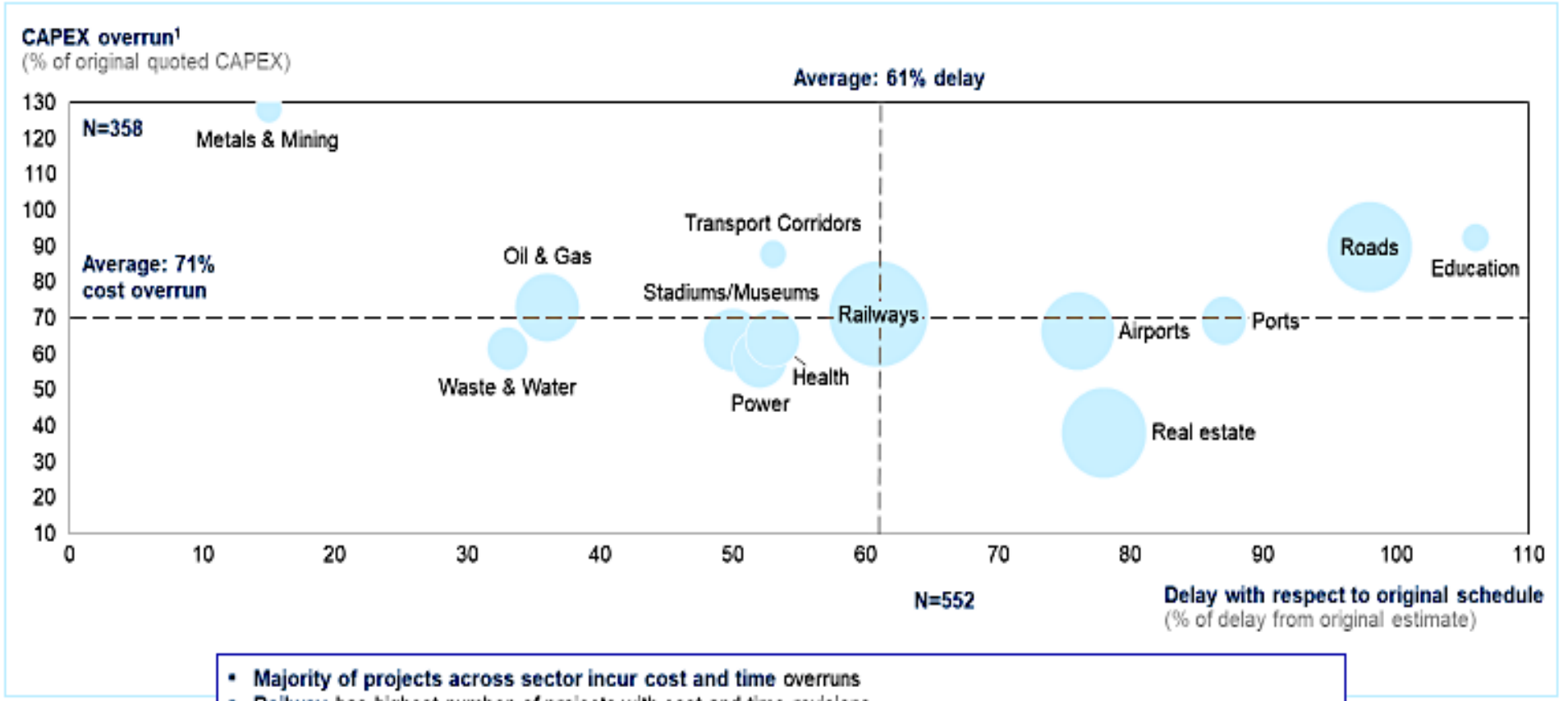
THE EFFECT OF TECHNOLOGY AND NEWER GENERATIONS ON COMPANY CULTURE

culture SHIFT

Mega-Project Performance



Our assessment of project performance across various asset classes shows poor overall compliance with budget and schedule parameters



- **Majority of projects across sector incur cost and time** overruns
- **Railway** has highest number of projects with cost and time revisions
- **Metals & Mining** is most impacted on **cost front** whereas 'Roads', 'Education 'and 'Ports have **steep high delays**

1 Excludes projects with outliers

Reference: McKinsey & Company "Reinventing Construction: a route map to improved productivity"

McKinsey & Company 1

Industry Investment in Technology



Level of digitization

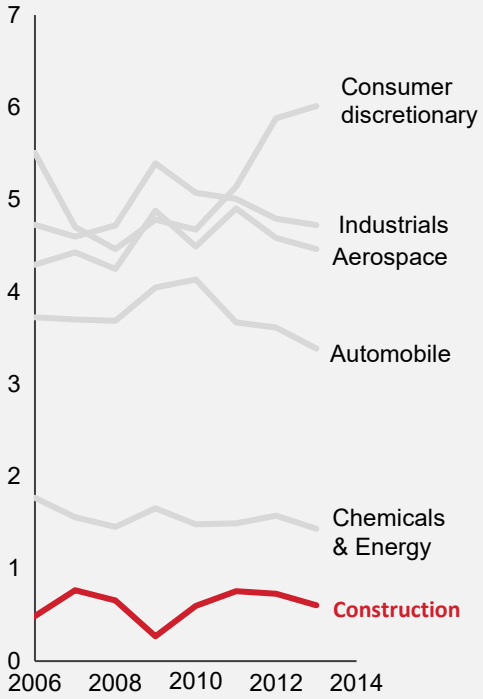
MGI industry digitization index, or latest available data



ICT
Media
Professional services
Finance and insurance
Wholesale trade
Advanced manufacturing
Oil and gas
Utilities
Chemicals and pharmaceuticals
Basic goods manufacturing
Mining
Real estate
Transportation and warehousing
Education
Retail trade
Entertainment and recreation
Personal and local services
Government
Healthcare
Hospitality
CONSTRUCTION
Agriculture and Hunting

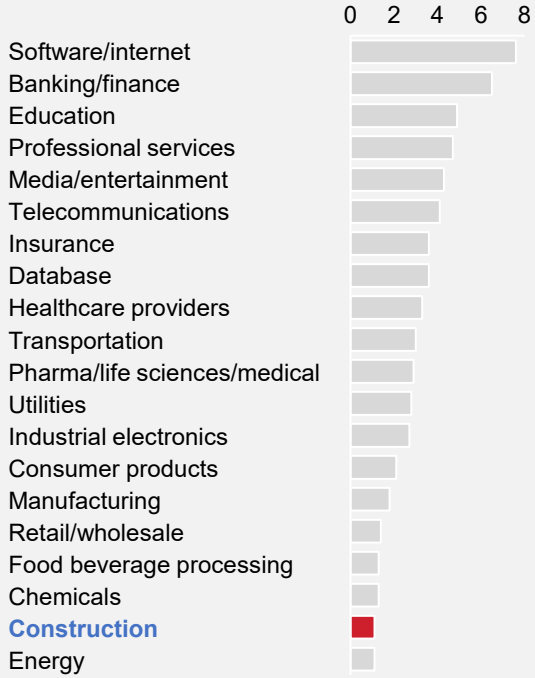
R&D investment

% of revenue spent on R&D



IT spending

% of revenue spent on IT



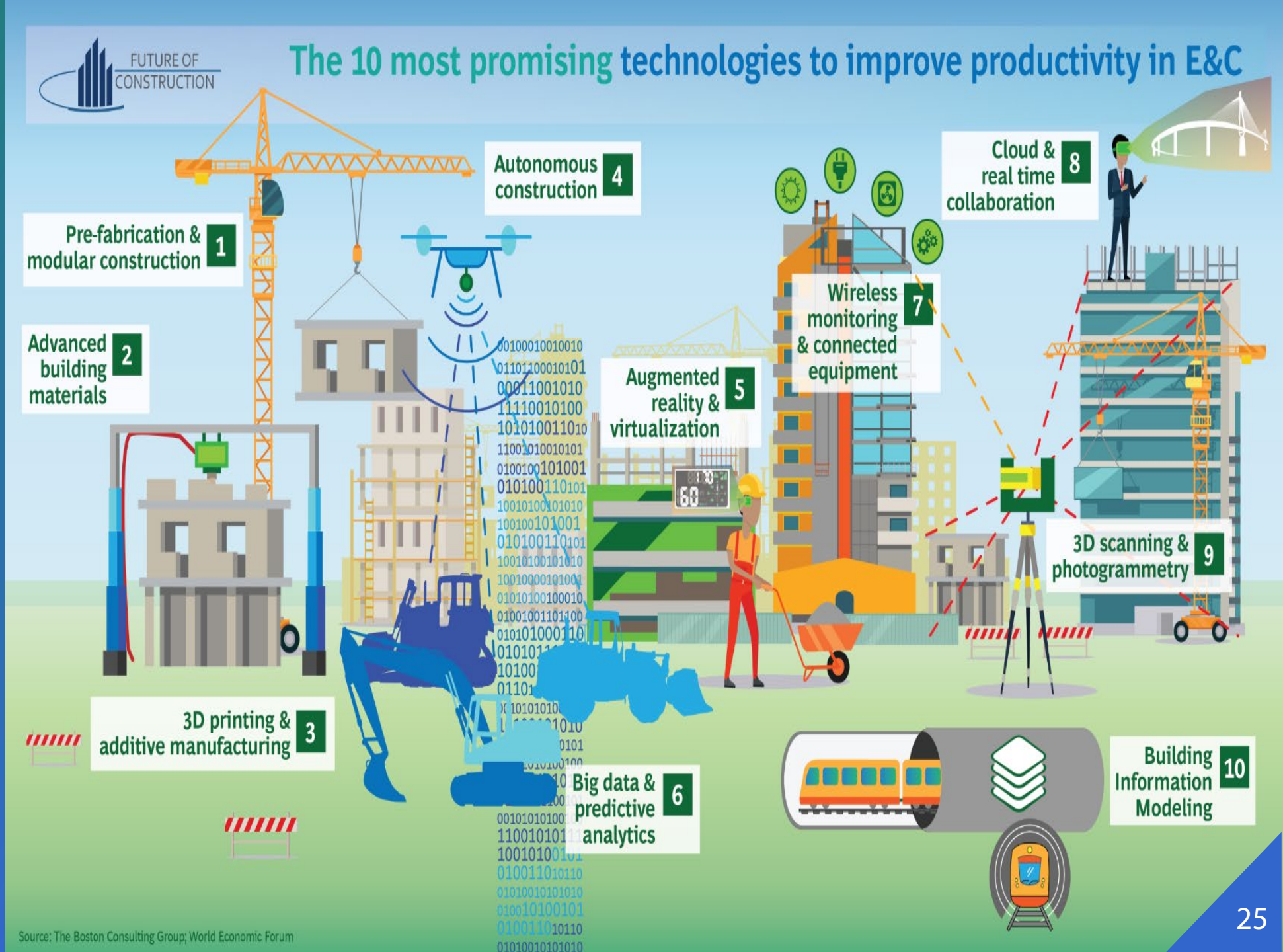
1 Based on data of top 20 E&C companies by market value Globally 2 Top 20 companies by market value

SOURCE: Capital IQ, Gartner IT key metrics data

Reference: McKinsey & Company "Reinventing Construction: a route map to improved productivity"



Industry Investment in Technology





Thank you!