



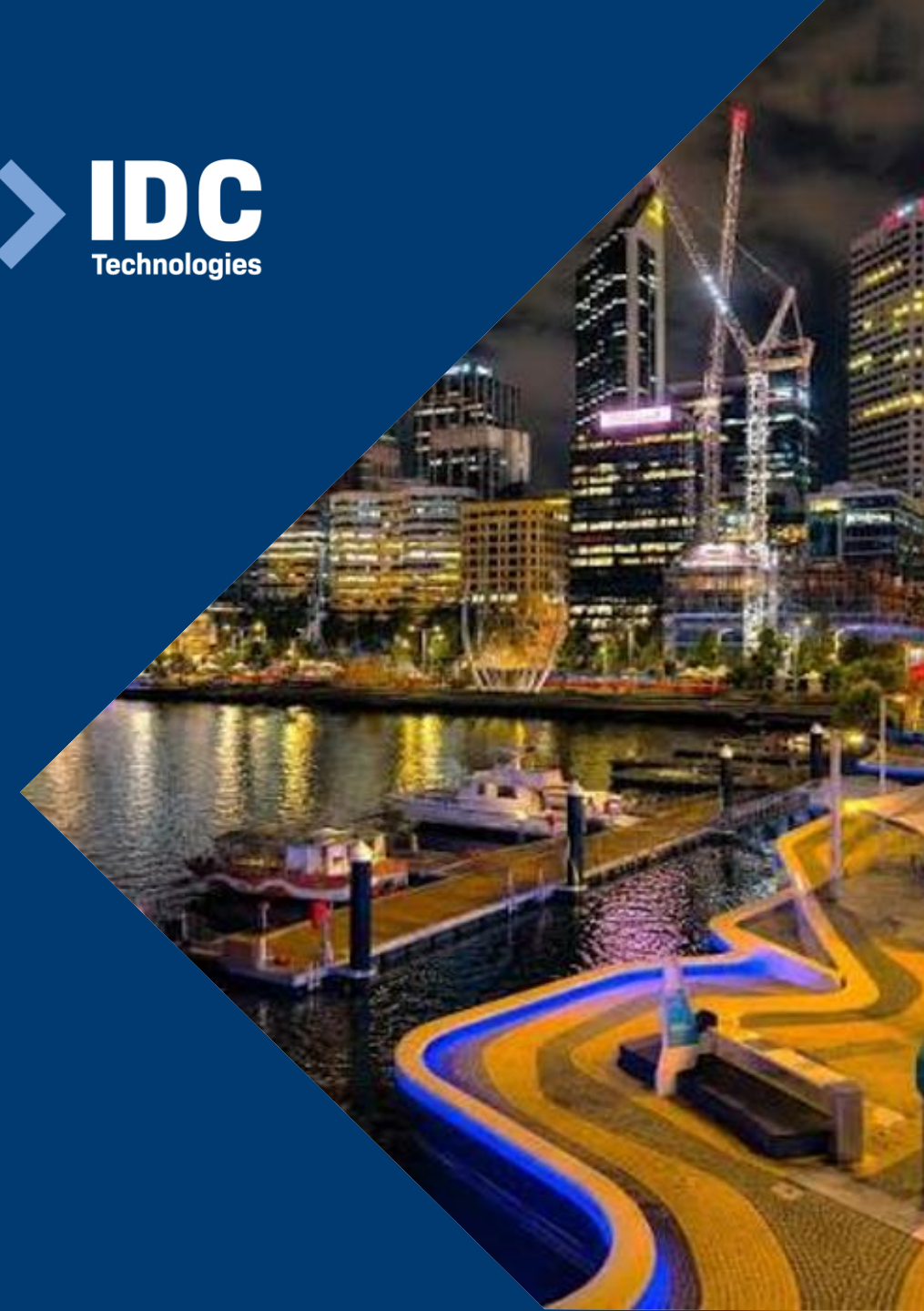
Industry 4.0 Webinar Automation Meets Intelligence in Cyber-Physical Systems

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Pradeep Chokhdayat

Head – Engineering, Asset Management & CyberSec



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Introduction – Presenter

Pradeep Chokhdayat, MIEAust

Strategic Leader | Engineering & Asset Management

Pioneering Smart Manufacturing & Digital Transformation Initiatives

20+ years delivering quantifiable operational excellence and strategic transformation across Heavy Engineering, Defence, Aerospace, Nuclear, Pulp Manufacturing, & Energy sectors.

Bachelor's in Power Engineering, MBA

Strategic Domain Mastery

Defence | Aerospace | Nuclear | Energy | Pulp & Paper

Precision Leadership in Critical Sectors

Pradeep excels in highly regulated, demanding industrial sectors where precision, safety, and reliability are paramount. His expertise in electrical and automation systems ensures operational excellence in critical infrastructure.

Technical & Commissioning Leadership

Leads complex system commissioning, vendor management, and technical teams across multiple critical projects.

Financial Optimization & Efficiency

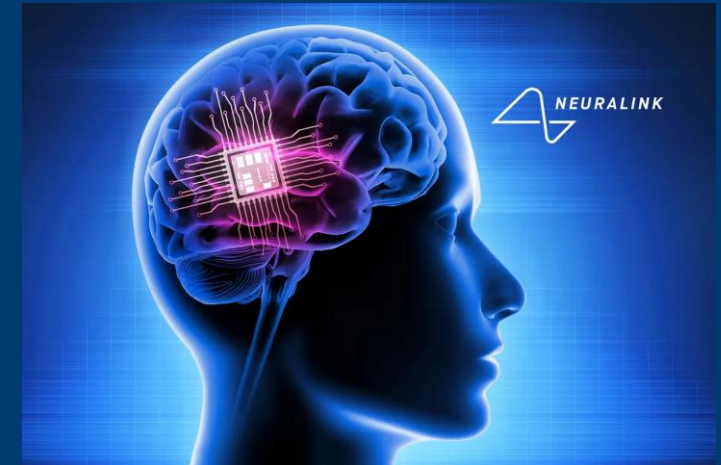
Delivers significant CapEx/OpEx savings, maintaining operational excellence and rigorous safety standards.

Advanced Technology Integration

Drives integration of robotics, AI, sensors, and industrial IoT for enhanced precision and predictive capabilities.



Where is the future heading towards?



Before We Begin

“What if your phone could talk to your house,
your car, and your office building at its own and control ?”

QUESTION 1

How many devices in
your home are online
right now?

QUESTION 2

What if your washing
machine warned you 3
weeks before it broke?

QUESTION 3

What if machines could
prevent their own
failures?

This is not science fiction. It is happening today — in Whirlpool's factories, in smart grids, in hospitals.

This is Industry 4.0. This is the world of Cyber-Physical Systems.

Agenda

01	What is Industry 4.0?
02	Cyber-Physical Systems explained
03	Real-world case studies — with real numbers
04	Industries in transformation
05	The security challenge
06	Skills gap and your opportunity
07	Global perspective
08	Your next steps



Where Did Industry 4.0 Come From?

1.0

1760s · STEAM

Mechanical looms
and water power
Machines scale —
but they cannot think

2.0

1870s · ELECTRICITY

Assembly lines, mass
production
Fast and linear — but
rigid

3.0

1970s · COMPUTERS

Digital control and
programmable robots
Follows a script — no
prediction

4.0

NOW · INTELLIGENCE

IoT, AI, cloud and real-
time data
Machines monitor
themselves and predict
failure

The revolutionary part: the factory thinks. The shift is from *“it broke, fix it”* to *“it is about to break, prevent it.”*

The Formal Definition

Industry 4.0 is the seamless integration of **physical machines**, **digital systems** and **intelligent software** to create self-optimising, interconnected ecosystems that operate with minimal human intervention.

BREAKING IT DOWN

- **Physical machines** — equipment, sensors, robots
- **Digital systems** — software, cloud, networks
- **Intelligent software** — AI and predictive analytics
- **Self-optimising** — the system improves itself
- **Interconnected** — everything talks to everything
- **Autonomous** — humans decide strategy, not settings

Industry 3.0 is a student following instructions. Industry 4.0 is a student with a tutor — the system watches, learns and adapts.

What Are Cyber-Physical Systems?

CYBER

Software, data, algorithms,
the cloud

+

PHYSICAL

Machines, sensors,
motors, people

=

CPS

Both worlds
talking, constantly

THE SIX BUILDING BLOCKS

- **Sensors** — measure the physical world
- **Computing** — edge devices plus cloud
- **Networking** — 5G, fibre, Ethernet, WiFi
- **Analytics** — where the intelligence lives
- **Physical devices** — machines that act
- **Human interface** — dashboards and alerts

Your heart, lungs and brain are not independent — they coordinate. **A smart factory is designed the same way.**

What Are Cyber-Physical Systems?

Cyber-Physical Systems (CPS)

The Feedback Loop: One Intelligent Pump

STEP 1

Sensors

Vibration,
heat, pressure
— streaming
24/7

STEP 2

Computing

Edge device
flags: “vibration
up 50%”

STEP 3

Networking

Alert travels to
every
connected
system

STEP 4

Analytics

AI: “this
pattern means
failure in 3
weeks”

STEP 5

Action

Slow the
pump, order
the part, book
the window

STEP 6

Feedback

Loop closes
— monitoring
never stops

WHY THE LOOP MATTERS

Without CPS

You learn the pump failed when it stops.

Repair cost: **US\$200,000+**

Downtime: **3–7 days**

With CPS

You catch it three weeks early.

Replacement on **your** schedule.

Zero emergency, zero production loss.

A Question For You

You manage a factory. You have US\$500,000 to spend.
Which do you choose?

OPTION A

Build a warehouse of spare parts, so you can scramble when things break.

OPTION B

Install sensors and AI, so you know what will break — and when.

Hold your answer. The next two slides are real companies that made this exact choice.



CASE STUDY 1 • PREDICTIVE MAINTENANCE

Whirlpool: From Clipboards to AI

BEFORE

- Technicians walked the line with clipboards
- Faults found only after the breakdown
- A US\$100 bearing became a US\$5,000 repair
- Teams lived in permanent crisis mode

AFTER

- Sensors on hundreds of critical machines
- AI trained on years of failure data
- Alerts only on true failure patterns
- Planned work, in daytime hours

\$1M+

saved in avoided
downtime

95%

monitoring coverage

85%

accuracy on predicted
failures

3 weeks

average warning lead
time

Whirlpool did not replace workers with robots — **they equipped workers with intelligence.**

CASE STUDY 2 · THE DISASTER THAT DID NOT HAPPEN

Ingredion: One Pump, US\$1.23M

THE FIRST TIME

A critical pump failed with no warning. The 24/7 plant went dark for **three full days**.

THEY DEPLOYED CPS

Sensors on every similar pump — vibration, temperature, pressure, flow — feeding an ML model.

THE MOMENT OF TRUTH

“Looseness detected. 95% confidence. Failure in 14 days.”
Invisible to the human eye.

168 hours

of downtime prevented

\$1.0M

in production revenue protected

\$1.23M

total impact — one pump, one year

THE P-F CURVE

Between **potential failure** (detectable) and **functional failure** (it breaks) sits a window.

For this pump it was 14 days.

Without CPS, Ingredion had zero visibility into that window. With CPS, they own it.



The Grid: From Static to Smart

TRADITIONAL GRID

Plant → Lines → Substation → Home

- Power flows one way only
- Consumption known when the bill arrives
- Demand spike → blackout
- Renewables too unpredictable to scale

SMART GRID (CPS)

Plant ⇄ Transformer ⇄ Meter ⇄ Home

- Real-time visibility, second by second
- Forecasts tomorrow's demand and supply
- Devices adjust themselves automatically
- Rooftop solar flows back to the grid

WHY IT MATTERS

Eight billion people need electricity and we cannot keep burning coal. Renewables are the answer — but they are intermittent.

CPS and smart grids are what make renewables viable at global scale.

Morocco: Renewables at Scale

Abundant sun and wind, but a grid that could not absorb them. From 2019, Morocco deployed CPS sensors and controls across the network.

3,000+ MW

renewable capacity
integrated

30%

lower greenhouse gas
emissions

15%

better energy efficiency

Zero

increase in blackouts

WHAT THE GRID CAN NOW SAY TO ITSELF

“Wind in region A is producing 1,200 MW. Demand in region B is 900 MW. Send 300 MW to region C - evening demand is rising.”

THE CAREER ANGLE

Every country is racing to upgrade its grid. Smart grid skills travel — a grid engineer can work almost anywhere.

Where CPS Saves Lives

Wearable heart monitors

AI watches rhythm 24/7 and flags a pre-stroke pattern hours before symptoms.
40% lower stroke risk

AI insulin pumps

Glucose read every 5 minutes; the pump adjusts dosing while the patient sleeps.
50% more time in safe range

Surgical robots

Tissue-resistance feedback and ± 0.5 mm precision versus ± 2 mm human tremor.
15–30% faster recovery

ICU monitoring

20+ parameters watched at once — spots a pulmonary embolism humans would miss.
25% fewer complications

ONE PATIENT'S NIGHT

At 2 a.m. the algorithm detects an irregular rhythm matching a learned pre-stroke pattern. The phone buzzes. The cardiologist sees the data immediately. Anticoagulants start that morning.
The clot never forms. The stroke never happens.

The Economics of Prevention



Healthcare spending is straining economies — the US spends about 18% of GDP. One preventable infection costs US\$30,000–50,000. One 30-day readmission costs US\$10,000–20,000.

HOSPITALS WITH FULL CPS MONITORING REPORT

20–25%

fewer readmissions

25–30%

fewer acquired
infections

15–20%

better chronic-condition
outcomes

10–15%

lower overall cost of
care

Deployed nationwide across the US, comprehensive CPS monitoring could save an estimated **US\$200–400 billion a year** — while improving outcomes.

Beyond the numbers: people stay alive, recover faster, and get more years with their families.

A Question For You

Would you let a robot remove your appendix?

HUMAN SURGEON

~ 95% success

ROBOT-ASSISTED

~ 99.5% success

Most people say yes. And that is the real future of healthcare — **not robots replacing doctors, but CPS augmenting human judgement.**

Five Factories, Five Lessons

Sherwin-Williams

564 hours downtime prevented

20% fewer emergency work orders; US\$150K+ saved via vibration and thermal imaging.



Bosch



BOSCH

29% fewer repeat failures

ML read 35,000 work orders a year and found the shared root causes. US\$2M+ saved.

Pirelli



Zero breakdowns on 150+ assets

98% alert engagement; 77 failures caught early — won by aligning people, not just sensors.

Whirlpool

US\$1M+ saved through predictive maintenance



Ingredion

US\$1.23M impact from one averted crisis



The equation every plant manager knows: **unplanned downtime costs roughly 10× planned maint.**

Every Story Follows the Same Arc



1

Before

Reactive crisis management. Breakdowns are surprises. Everyone is stressed.

2

Deploy

Install sensors. Feed the data to AI. Build real-time dashboards.

3

Transition

Scepticism fades as the predictions keep coming true.

4

After

Planned downtime. No surprises. Costs down 20–40%.

TIME TO FULL BENEFIT

6–12 months from deployment

THE SIMPLE MATH

US\$100K planned $\approx$ US\$1M avoided

If your competitor runs without emergency shutdowns and you cannot, **who wins the contract?**

From Silos to a Single Organism

One pharmaceutical plant. Five systems that used to argue with each other — now optimising for one shared goal.

SILOED — EVERY SYSTEM ARGUES

- Manufacturing: “Run 24/7 to meet demand”
- Energy: “Use power now, solar is high”
- Storage: “Hold 2–8 °C, cost is not my problem”
- Logistics: “Shortest route wins”
- Compliance: “Document everything for ten years”

INTEGRATED — ONE SHARED GOAL

“Deliver quality product on time, at minimum cost, with zero regulatory violations and minimum environmental impact.”

Every system knows the goal. Every decision supports it.

Single-system optimisation is decades old. **Multi-system optimisation at this complexity is new — and that is Industry 4.0.**

One Plant, Three Scenarios



SCENARIO 1

High solar day

Energy tells manufacturing there are six hours of cheap renewable power. Maintenance runs now; storage eases cooling briefly.

US\$5–10K saved that day

SCENARIO 2

Contamination risk

87% confidence alert.

Compliance quarantines the batch, quality runs fast testing, logistics reroutes, production pauses.

No hospital goes short

SCENARIO 3

Emergency order

10,000 antibiotic units needed in 48 hours. Energy authorises peak running, production compresses 72 hours into 36.

Delivered in 46 hours

Without CPS each of these needs emergency meetings and approval chains — **a day just to decide.**

A Question For You



Can you name a business where connecting two systems that never talk , would save real money?

Every business. Every single one.

That is why Industry 4.0 is reaching every sector.

And the people who can do it need to understand manufacturing *and* energy *and* logistics *and* code. They are extraordinarily rare.

THE PART NOBODY WANTS TO HEAR

More Connected Means More Exposed

IT SECURITY PROTECTS

Data

Prevent theft. Prevent unauthorised access.

Preserve integrity.

A stolen card number is bad — but it is containable.

CPS SECURITY PROTECTS

Physical control and human safety

Attackers do not just want your data. They want to make things move.

WHAT A BREACH ACTUALLY MEANS

Hacked production line

Starts making defective product

Hacked power grid

Blackouts affecting millions

Hacked hospital system

Life-support equipment shuts down

Delete data and it is a loss. Move a CNC machine when it should not move and **someone gets hurt.**

Three Weeks Inside, Undetected

HOW THEY GOT IN — THREE VECTORS

Weak credentials

One maintenance technician's password — probably reused from another site.

No segmentation

Operational technology sat on the same network as corporate IT. One breach, then lateral movement.

Delayed detection

Attackers mapped the system for three weeks before anyone noticed.

WHAT COULD HAVE HAPPENED

Open the floodgates, disable the warning sirens, and thousands of homes downstream are in the water.

WHAT ACTUALLY STOPPED IT

A human analyst noticed commands coming from an IP address that had no business issuing them — and investigated.

Five Hard Security Problems

1 • Legacy equipment

A CNC machine from 1995 still earns its keep. No security features, proprietary protocol, vendor long gone. You cannot patch it — you segment it.

2 • Proprietary protocols

Vendor A speaks Protocol X, Vendor B speaks Y. Every bridge and gateway is another way in. MQTT and OPC-UA help, slowly.

3 • You cannot stop to patch

IT takes a two-hour maintenance window. A hospital cannot switch off life support. Updates must land while the system runs.

4 • The air-gap myth

Diagnostic laptops get plugged in. Vendors need remote access. Enterprise IT integrates. Personal phones join the WiFi.

The air gap does not exist any more — you are connected whether you meant to be or not.

5 • Security has its own skills gap

Security experts come from IT and do not know how plants run. Industrial engineers know plants and not security.

You need both in one head — and those people are rare.

What Breaches Actually Cost

MANUFACTURING • 2021

Ransomware shut down multiple plants at a major automotive supplier.

US\$2M+ per day

in lost production

HEALTHCARE • 2020

Surgeries cancelled, ambulances diverted. One patient died from delayed care.

US\$10M+

lawsuit settlement

ENERGY • 2015

A utility attack caused blackouts affecting 230,000 people.

US\$43M + US\$25M

recovery plus regulatory fines

BUT HERE IS THE IMPORTANT PART

None of this is a reason to avoid Industry 4.0 — it is a reason to build security in from day one. Every company deploying CPS is now hiring security people, at high salaries, with C-suite attention. **The risk is real. So is the career it creates.**

WHAT ACTUALLY WORKS



Five Proven Frameworks

Never assume anything is safe. Every device proves who it is, every time — even the CEO's.

Segmentation

Critical operations, OT and business IT in separate zones. Breach one, you still cannot reach the others.

Asset visibility

Know every device: model, vendor, firmware, who can access it. Most firms find hardware they never knew existed.

Threat monitoring

ML learns 12 months of normal behaviour, then flags the deviations a human analyst could never catch.

Incident response

A rehearsed plan. Firms with one recover 5–10× faster.

WHAT COMPANIES REPORT AFTER DEPLOYING ALL FIVE

70–80%

fewer successful attacks

90%+

faster detection — days to hours

5×

faster recovery time

The global framework for cybersecurity in industrial automation, developed by the International Society of Automation. It defines four security levels.

SL1

Basic

Documented policies.
Change management.

SL2

Stronger controls

Access management.
Security awareness
training.

SL3

Advanced

Incident response and
threat detection.
Required for most
critical infrastructure.

SL4

Maximum

Extreme resilience and
forensics. National
security systems.

WHY THIS MATTERS TO YOU

Power plants and water utilities must generally reach SL3. If you are heading into manufacturing or utilities, **understanding IEC 62443 is not optional — it is the language of the job.**

A Question For You

You are designing a secure smart factory.
What do you fund first — technology or people?

MOST PEOPLE SAY

Technology

THE RIGHT ANSWER

People

Technology is about 60% of security; the other 40% is human discipline. Most healthcare breaches still start with someone clicking a phishing link.

Technology without discipline is theatre.

THE STANDARD EVERY MAJOR MANUFACTURER USES

ISO 55000



10,000 machines, 50 factories, US\$10M a year to spend. Maintain everything equally? Only what breaks? **Or allocate by risk.**

CALENDAR MAINTENANCE

A spreadsheet and a six-month rule. A 30-year-old machine gets the same budget as a two-year-old one.

Result: good assets over-maintained, critical assets under-maintained, failures still a surprise.

CONDITION-BASED (ISO 55000 + CPS)

Risk = probability × consequence. Sensors supply the probability in real time.

“Bearing at 62 °C, trending to 75 °C in four weeks. Schedule replacement.”

100 MOTORS, ONE FACTORY — WHAT THE NUMBERS LOOK LIKE

US\$120K

risk-based maintenance

US\$200K

maintaining everything equally

US\$700K

waiting for failures

TEST BEFORE YOU BREAK

Digital Twins



A living virtual replica of a physical asset, updated in real time from its sensors. **Not a CAD model. Not a simulation. A counterpart.**

JET ENGINES

Rolls-Royce builds a twin for every engine. In flight, thousands of sensors — temperature at 47 points, pressure, vibration, fuel flow — stream to the cloud. 24 hours before a predicted failure the airline gets a call. Maintenance happens on the ground.

A ROBOTIC ARM

Simulate six months of work in two minutes. At cycle 4,673 the arm clips a part holder. Adjust the trajectory three degrees, re-run 10,000 cycles, no collision. Found on the real line instead? US\$50K of damage and a stopped plant.

WHAT SIEMENS REPORTS FROM MANUFACTURERS USING TWINS

30% less

development time

40% faster

time to market

50% fewer

field failures

Where Should the Brain Live?

CLOUD · CENTRALISED

Strengths: huge compute, models trained across 50 plants, pay only for what you use.

Costs: latency, dependence on the connection, and every byte leaves your facility.

Answers in seconds

EDGE · DISTRIBUTED

Strengths: millisecond reaction, keeps working when the internet drops, raw data never leaves site.

Costs: 1,000 devices to manage, hardware per location, limited compute.

Answers in milliseconds

THE REAL ANSWER IS HYBRID

Safety decisions run on the edge. A gripper detects a falling object and brakes in 10 ms. A self-driving car brakes for a pedestrian in 50 ms.

Strategic decisions run in the cloud. Which line is trending to failure? Which supplier is most reliable? Should we retrofit every similar motor?

A Question For You

100 milliseconds or 2 seconds - which do you design for?

A ROBOTIC GRIPPER

Holding an object it must not drop →
100 ms, edge

A WAREHOUSE INVENTORY SYSTEM

2 seconds is completely fine → cloud

There is no universal answer — **and understanding that trade-off deeply is what separates a good engineer from a mediocre one.**

IT IS NOT JUST FACTORIES

Five More Sectors Being Rebuilt



Smart buildings

HVAC learns occupancy, lighting follows daylight, leaks found before damage.

Singapore office: 28% less energy, 50% fewer emergency calls

Transportation

Lights coordinate in real time; vehicles talk to each other and reroute around incidents.

Copenhagen: congestion down 18%, emissions down 12%

Agriculture

Drones spot disease; soil sensors time irrigation; tractors drive themselves.

India co-operative: yields up 22%, water down 30%

Water utilities

Pressure sensors find leaks in hours instead of when the street floods.

Barcelona: losses down 18%, €5M saved a year

Smart cities — where all of it comes together

At 6 p.m. everyone cooks dinner. The city shifts water pumping off-peak, nudges EV charging overnight, eases building HVAC by a degree, and calls on rooftop solar and batteries.

Barcelona: energy –15%, water –20% · Amsterdam: grid, buildings and waste run as one system

Where the Jobs Actually Sit

SHARE OF AVAILABLE CPS ROLES BY SECTOR

Manufacturing **40%**

Energy and utilities **20%**

Healthcare **15%**

Agriculture, buildings and smart cities **15%**

Transportation **10%**

MOST CONCENTRATED

Europe, North America, East Asia

FASTEST GROWING

India, Southeast Asia, Latin America and Africa

Why Projects Stall or Fail

Legacy systems

A 1995 machine still makes good product. Replacing it costs US\$2M. Force it online carelessly and you risk safety and scrap.

Data silos

Production says 10,000 units.
Quality says 150 defects.
Maintenance says four hours down. Nobody can ask which machine caused it.

Resistance to change

“I have worked this equipment 25 years — the computer is wrong.” Human, understandable, and the main reason rollouts take a decade.

Privacy and regulation

GDPR requires consent for worker location data.
HIPAA governs any patient monitoring. Fifty countries can mean fifty variants of one system.

Interoperability and lock-in

One factory with ten sensor vendors needed eight months and US\$400K of integration to get a single standard data format.

These challenges are exactly **why skilled people are needed** — a reason to enter the field, not avoid it.

What It Really Costs

FIRST TWO YEARS • MID-SIZE FACTORY, 3–5 LINES

Hardware — sensors, computing, network	\$0.5–2M
Integration and customisation	\$0.3–1M
Consulting	\$200–500K
Software licences	\$100–300K
Training	\$50–150K
Total	\$1.15–4.45M

THE PATH TO POSITIVE ROI

Pilot — one line

6 months, US\$300–500K

Full deployment

18–24 months, US\$2–5M

Break even

After 2–3 years

Industry 4.0 is not a flip of a switch. It is a 10–15 year journey with failed pilots and organisational friction.

Those who push through win big. Those who do half-measures write it off as hype.

Five Success Factors

Executive sponsorship

Air cover through the setbacks and budget reviews.

95% of successes had it

Cross-functional teams

Engineering, IT, ops, security, finance and HR at one table.

5× more likely to succeed

Start small, scale

One line first.

Prove ROI. Let success fund the next phase.

80%+ success vs 40% for big bets

Invest in training

Budget 5–10% of project cost.

Teams that understand the system debug it.

Bosch: US\$150K → US\$2M+ ROI

Security from day 1

Secure by design costs 10% more.

Retrofitting costs 5×.

THE ODDS

All five factors → it succeeds

Four → around 75%

Three → around 50%

Two or fewer → it likely fails

WHAT THAT MEANS FOR YOU

When your company wants to cut training, fight for it. When security is deprioritised, speak up.

Good engineers know these factors and defend them.

Three Tracks, All in Demand



TRACK 1

Technical

You build the systems

CPS architect · IoT engineer ·
data engineer · security
specialist · twin developer
BS in CS or EE, certifications,
strong Python

\$80–120K entry

\$130–200K+ senior

TRACK 2

Operations

You run the systems

Reliability engineer · operations
manager · maintenance
manager · quality engineer
BS in industrial or mechanical
engineering plus plant experience

\$70–100K entry

\$120–160K+ senior

TRACK 3

Product & strategy

You advise and sell

Solutions architect · product
manager · consultant
5+ years technical plus business
acumen

\$100–150K early

\$200–400K+ senior

Choose technical if you love building · **operations** if you love people and process · **strategy** if you love the business side.

FIVE ACTIONS



What You Can Do This Week

1

Take a free course

Coursera IoT or edX Industry 4.0. Audit them free, 5–10 hours a week.

2

Build something

Arduino and a sensor, US\$50 and ten hours. Prove it to yourself.

3

Read the industry

Thirty minutes a week. You will absorb the vocabulary before you need it.

4

Network

Webinars, local meetups, thoughtful messages. One connection opens doors.

5

Get certified

Once you have a course and a project behind you.

WHAT GETS YOU HIRED

Relevant coursework · projects on GitHub · one certification · industry connections.

That profile gets interviews. Companies are desperate for it.

THE ONE RULE

Do not wait for perfect clarity — you will never feel completely ready.

One action this week. Another next month. That is how it compounds.

Where in the World

REGION	STATUS	JUNIOR SALARY	ANNUAL GROWTH
Germany & Central Europe	The birthplace — highest adoption	€60–100K	10–15%
USA	Tech hubs plus manufacturing clusters	\$100–150K	20–30%
China	Retrofitting factories at scale	\$40–80K	40–50%
India & Southeast Asia	New plants built with CPS, no legacy	\$15–35K	100–200%
Latin America	Energy sector leading the way	\$25–50K	30–50%

Remote work is normal in this field now, and time zones are manageable.

You are building skills that are needed everywhere — geography limits you far less than in most professions.

Industry 4.0 as Climate Strategy

Industry — manufacturing, energy, agriculture and transport — accounts for roughly **65% of global emissions**. Making it smarter is a direct climate strategy.

Manufacturing

Asset life extended 20–30%. Energy use down 15–25%. Material waste down 10–20%.

Grids

Renewable variability managed, so solar and wind become the primary source, not a niche.

Agriculture

Precision irrigation uses 30–40% less water; 20–30% fewer chemicals on the soil.

Transport

Optimal routing saves 10–20% fuel; traffic coordination cuts emissions 10–15%.

AT GLOBAL SCALE

If every factory adopted CPS predictive maintenance, industrial energy use would fall an estimated 5–8% — roughly **500–800 million tonnes of CO₂ not emitted each year**.

“But Won't Robots Take the Jobs?”



ONE FACTORY, 500 → 400 WORKERS

- 100 assembly roles
- +50 CPS maintenance technicians
- +30 data engineers
- +20 robotic systems trainers

Net zero — but the jobs are better ones.

AND SAFER ONES

Dangerous tasks move to robots. Less chemical exposure, less repetitive strain, less time in heat and noise. Sensors catch hazards immediately.

Developing economies can leapfrog straight to clean manufacturing.

THE HONEST CAVEAT

CPS can also be used to extract faster, centralise power, or track workers into burnout. **Technology is neutral. Intent is not.**

You will have leverage in this job market. **Use it to choose employers who build these systems for good.**

IF YOU FORGET EVERYTHING ELSE



Five Things to Remember

1 • Automation + intelligence + connection

Not just robots — machines that learn, predict, optimise and coordinate.

2 • CPS is the backbone

Sensors → computing → networking → analytics
→ action → feedback, forever.

3 • Real money, real lives

Whirlpool US\$1M+. Ingredion US\$1.23M. Strokes prevented. Grids decarbonised.

4 • Security is critical

Not IT security — preventing physical harm.
Urgent, complex, and a career in itself.

5 • The skills gap is historically unusual

In engineering there are normally more people than jobs. Right now jobs dramatically exceed people.
Your generation is uniquely positioned to be rare, valuable and well paid.

WHY YOU SHOULD CARE

Your Generation's Moment



The generation before you built the internet.

Your generation is connecting everything else to it.

2030

Your CPS system prevents ten failures that would have stopped production. US\$5M+ saved — and a crisis that never happened.

2035

A hospital monitoring system you designed flags early warnings in 500+ patients a month. Strokes prevented. Lives continued.

2040

A city integrates energy, transport and buildings on your advice. Emissions fall 40%. Other cities copy it.

You are not competing against millions — at most against thousands.

Take one action this week. In twelve months you will have coursework, a project, a certification and a network.

Questions & Answers



The questions that come up most often — ask these, or anything else.

“Isn't this just automation with a new name?”

“Will robots take all the jobs?”

“Do I need a degree to get into this field?”

“Which programming language should I learn first?”

“I already work in another field — can I transition?”

“How do I know if this field is right for me?”

Four to six weeks of exploration — one course and one project — tells you whether this is your field. **You do not need to commit years to find out.**

THANK YOU

Contact & Resources



STAY IN TOUCH

Email: Pradeep@auzvolt.com

LinkedIn: [profile link](#)

START THIS WEEK

Coursera — Introduction to IoT

edX — Industry 4.0 Fundamentals

Arduino starter kit — about US\$35

Create a free GitHub account

KEY WEBSITES

isa.org — ISA standards

docs.aws.amazon.com/iot — AWS IoT

claroty.com — CPS security

nist.gov — security frameworks

FOLLOW FOR NEWS

LinkedIn — search “Industry 4.0”

Plant Engineering Magazine

Control Engineering Magazine

NIST Cybersecurity Framework

The world is transforming — **and you get to help shape how. Thank you.**

Thank You!

EIT – Virtual Open Week 2026



Our Virtual Open Week is our biggest live online event yet, featuring a range of sessions across the week of **Monday, 12 October 2026**.

Register for the sessions that interest you to discover more about **who we are, what we do, and why we do it**.

Plus, enter our competition for your chance to WIN!

Win A Professional Certificate of your choice valued at up to **AU\$1,581!***

Choose a certificate that aligns with your goals, build in-demand skills, and take the next step towards your future.

How to enter:

Register → Attend live → Complete the survey → You're in the draw!

Will you be our winner?

*Terms & Conditions apply. Prize value varies depending on location and selected Professional Certificate. For full conditions visit: <https://www.eit.edu.au/event/eit-virtual-open-week-2026/>



Upcoming Courses



Please note: courses listed below are subject to their own regulatory requirements—refer to the relevant website for further information.

Engineering Institute of Technology (EIT) <i>Australian Accredited Qualifications & Short Courses</i>		Start Date
52886WA Advanced Diploma of Industrial Automation Engineering		06 October 2026
Professional Certificate of Competency in Digital Twins and Simulation Monitoring		13 October 2026
Professional Certificate of Competency in Control Valve Sizing, Selection and Maintenance		13 October 2026
Graduate Certificate in Industrial Automation Engineering		4 January 2027
Graduate Certificate in Industrial Automation and Machine Learning		4 January 2027
Master of Engineering (Industrial Automation)		4 January 2027
Master of Engineering – Applied Research (Industrial Automation)		4 January 2027
Bachelor of Science (Industrial Automation Engineering)		8 February 2027
Professional Certificate of Competency in Instrumentation, Automation & Process Control		16 March 2027

Upcoming Courses



Please note: courses listed below are offered by separate institutions in the UK and South Africa, each subject to their own regulatory requirements - refer to the relevant website for location-specific details.

Engineering College of Technology (ECT) <i>UK qualifications</i>		Start Date
Bachelor of Engineering (Honours) in Industrial Automation		8 February 2027
Bachelor of Engineering (Honours) in Electrical Engineering		8 February 2027
Master of Science (Power System Analysis and Renewable Integration)		28 September 2026
Master of Science (Industrial Automation and Instrumentation Control)		28 September 2026

Engineering College of Science and Technology (ECST) <i>South African accredited qualification & ECSA-endorsed</i>		Start Date
Bachelor of Engineering Technology in Mechanical Engineering		24 February 2027
Bachelor of Engineering Technology in Electrical Engineering		1 March 2027

Contact Us:



Website

www.eit.edu.au



Head Office

6 & 8 Thelma Street, West Perth,
Perth, WA 6005



Phone

Inside Australia: 1300 138 522
Outside Australia: +61 8 9321 1702



Email

webinars@eit.edu.au



Courses

<https://www.eit.edu.au/schedule/>



Website

www.ect.ac.uk



Head Office

Whittle Way, Stevenage SG1 2FS,
United Kingdom



Phone

Inside UK: 0208 335 4014
Outside UK: +44 208 335 401



Programmes

<https://www.ect.ac.uk/programmes/>



Website

www.ecst.ac.za



Head Office

Unit 3, Elevation Gardens,
Elevation Close, Water fall
Office Park, Midrand, 1686



Phone

Within South Africa: 010 823 4497
Outside South Africa: +27 11 823 4497



Programmes

[www.ecst.ac.za/course-
types/bachelor-of-engineering/](http://www.ecst.ac.za/course-types/bachelor-of-engineering/)