ACSFI / ICFPA JOINT SESSION

BRAINSTORMING ON ARTIFICIAL INTELLIGENCE (AI) IN THE FOREST SECTOR

Mark Chan Yan / 6 May 2025

PROFILE: MARK CHAN YAN

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- Mark is an electronics engineer and business executive with 25 years of experience in Operational Technologies and Industry
  - Industrial automation, electrification, manufacturing systems, data systems, artificial intelligence
  - Has held management and senior leadership roles in Sales & Marketing, Operations, Global Business Units and R&D
  - An alumnus of the University of Cape Town (South Africa) and the Institute of Management Development (Switzerland)
- Consults on holistic technology solutions to aid customers in improving safety, operability, profitability and sustainability
  - Marrying the key pillars of technology, people and knowledge, and organizational transformation
- Knowledge and experience in pulp & paper, metals rolling, oil & gas, mining, water & power utilities and data centers
  - Has lived in South Africa, Germany, Finland, Singapore and Australia serving local, regional and global markets
  - Worked for global technology firms ABB and Yokogawa, Finance with the Industrial Development Corporation, Industry with Sappi and GMG
- Mark currently leads the Digital Enterprise Solutions business for Yokogawa
  - Key focus on Artificial Intelligence (AI)

IMAGINE THIS SCENARIO…ALEX, AN EXECUTIVE IN FORESTRY, CALLS ON NOVA, THE CORPORATE'S AI ADVISOR

Good morning, Nova.

Um...I need an update of how we stand on our current harvest plan.

Can you also revise the plan for the next 6 months if you think that any natural habitats are experiencing increased impact?

Um...and advise if harvesting targets will be impacted too? Thanks Nova!

AND NOVA RESPONDS WITH……

Good morning, Alex. I've reviewed our active harvest zones using the latest drone data, environmental indicators, and biodiversity movements.

Here's a summary and 6-month outlook. The current status is that 44% of Q3 targets have been met on schedule. And all operations remain within ESG and regulatory thresholds.

However, there are 3 emerging Ecological Risks.

The first is in Sector 5D of the Highland Forest. The eastern curlew migratory flocks have arrived early, and nesting has been confirmed in three zones. I recommend extending the buffer by 600 meters eastward.

The second is in Sector 2A, home to the Lowland Eucalyptus. This burned six weeks ago resulting in a 38% canopy loss. Pioneer species are emerging now, but the soil remains unstable. I suggest that entry not be advised until at least the end of May.

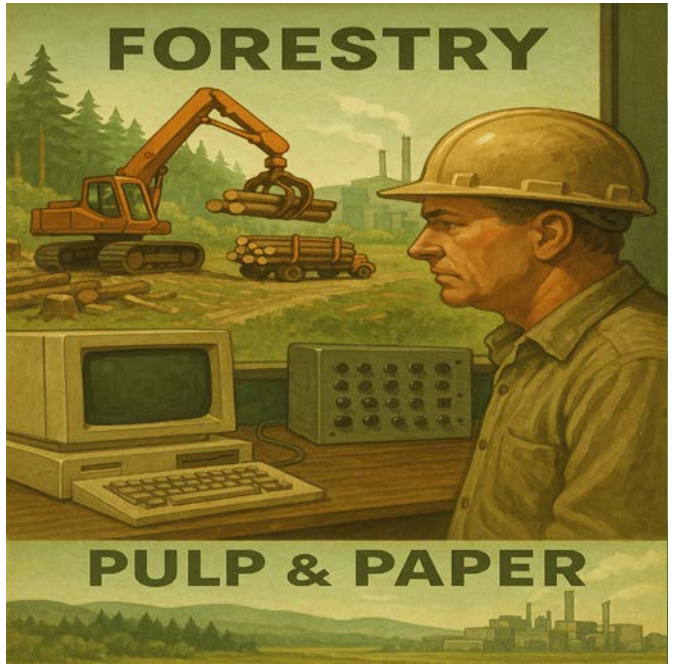
The third is the Yarra Tributary Zones where Frog spawning has been extended from four to six weeks due to heavy rainfall. There is a risk of runoff-related habitat stress if adjacent harvesting continues.

Here is my suggested revised plan for the next six months. Let's shift operations from Sectors 2A and 5D to northern plateaus, zones 7C and 8A. This will preserve 89% of target yield but will be accompanied by a 9.4 percent increase in haulage costs. The short-term impact will be an 11% reduction in yield with a long-term benefit that avoids future rehabilitation costs and strengthens ESG rating.

The updated plan and overlays are live on your dashboard. I will email this summary to you now.

Do you want me to coordinate a session with the biodiversity and operations leads this afternoon?

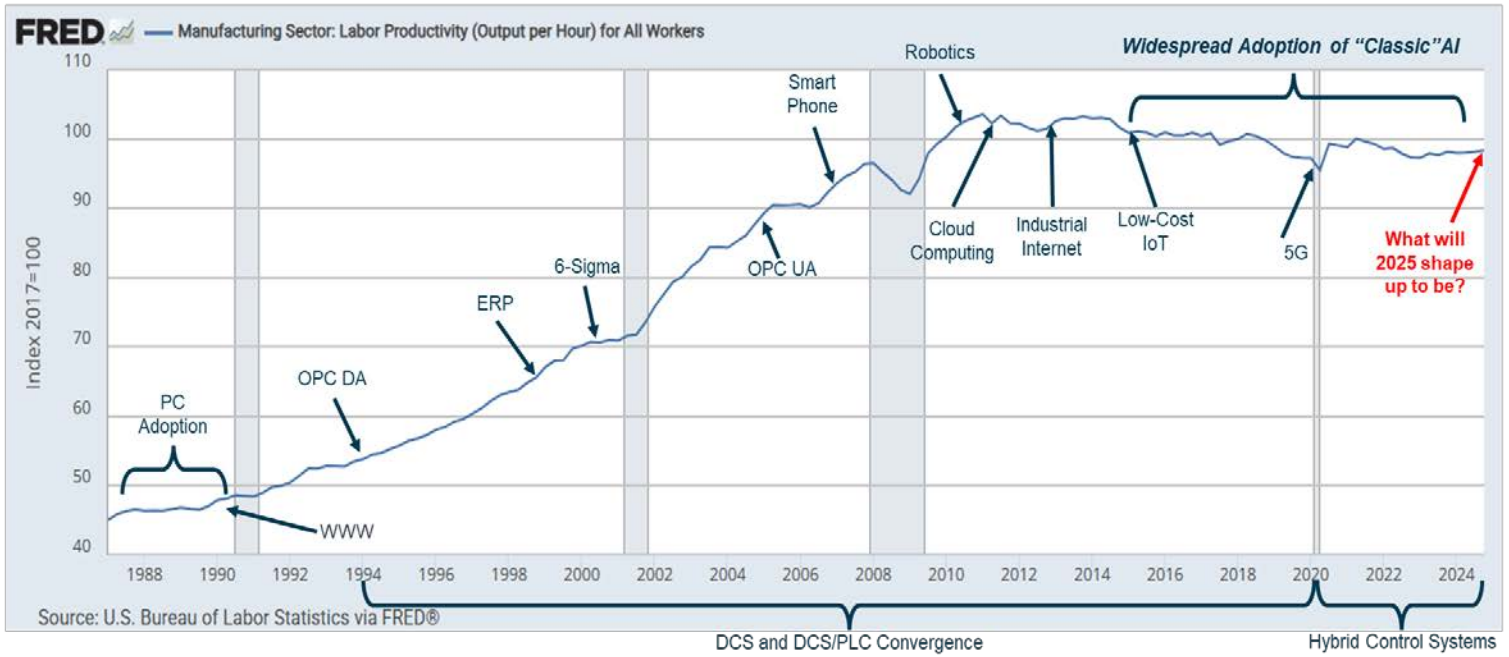
FROM SMART HOMES TO SMART FORESTS, TO SMART PULP & PAPER, TO SMART PACKAGING, TO SMART FORESTRY VALUE CHAIN



- Consumer AI: Seamless, adaptive, intuitive, conversational
  - AI music assistants
  - AI navigation
  - AI-enabled SMART homes
  - GenAI such as ChatGPT, Claude
- Industrial AI: Complex, siloed, user-unfriendly
  - Multiple screens / Technology overload
  - Information overload
  - Missing insights
  - Requires constant (highly skilled) human intervention
- Bridging the divide with natural language and human-centric design
  - Human augmentation
  - Contextual
  - Conversational
  - Multi-domain

WHY EARLIER AI EFFORTS FELL SHORT IN INDUSTRY

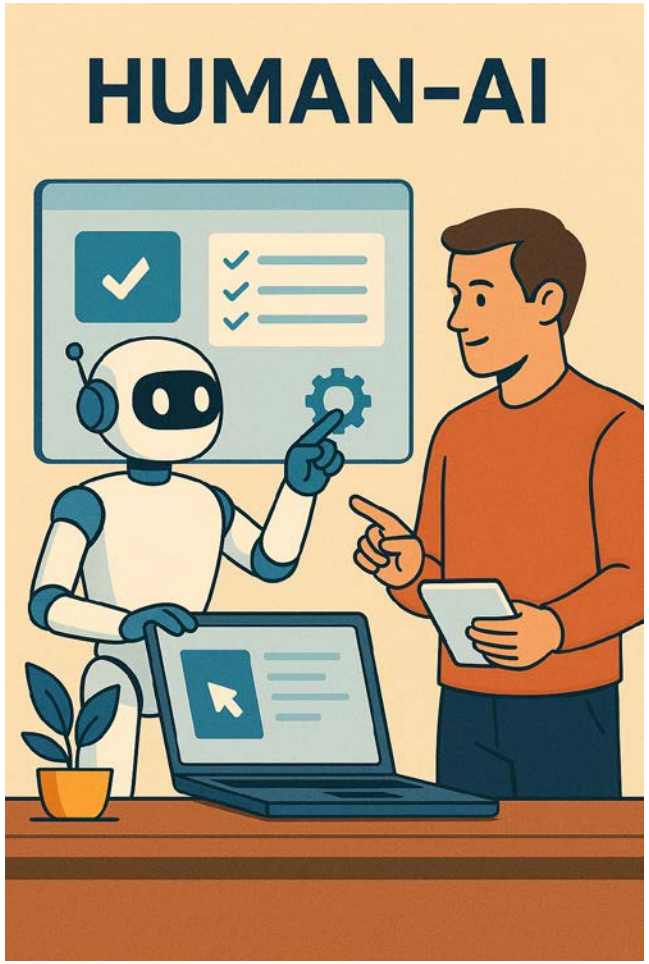
- Despite global events and turmoil, productivity in industrial manufacturing in the USA correlated strongly with the adoption of technology
- What happened from 2011 / 2012 onwards?



- Prioritized automation over human knowledge
- Lacked transparency and flexibility
  - Niche / Narrow
- User distrust
  - No idea what the AI was doing
  - Could not see "under the hood"
- Came at a time of deepening skills shortages
  - Did not provide skill augmentation
- Costly with uncertain returns
  - Inability to scale both technically and commercially
  - The AI required training and had to be retrained when conditions or variables changed too widely
- Remained siloed
  - Multiple and different systems

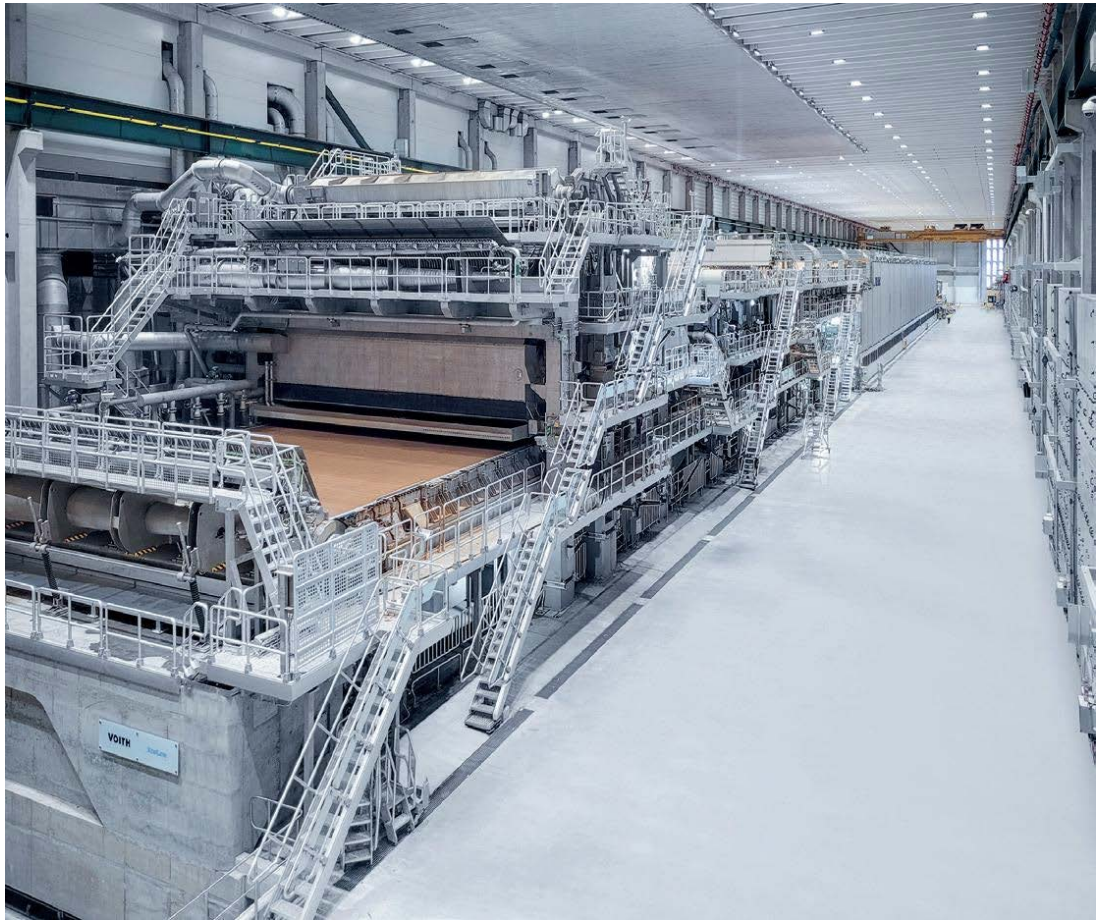
Note: AI has been hugely transformative in non-industrial use-cases such as banking & finance, pharmaceutical, e-commerce, retail and marketing, etc.

HUMAN-AI COLLABORATION: A NEW ERA CALLED AGENTIC AI



- Supports natural language conversations
  - (Any) language even dialects and multiple languages at the same time
- Understands deep context, learns from interactions
  - Cognitive and causal, learns like a human, understands industry jargon
- Enables experts to lead, not be replaced
  - True skill augmentation not skill replacement
- Improve training, confidence, and outcomes
  - Always learning and adapting
- Requires no / minimal coding
- Requires no specialist operators or user-ability
- Multiple AI Agents representing each domain in the value-chain
  - Sustainability, Production, Reliability, Quality, Energy, Economic, Etc
  - These AI Agents can interact with each other and provide advice across some or all domains enabling true decision-assistance across the entire production facility or value-chain

USE CASE EXAMPLE 1: AGENTIC AI IN PAPER MILLS



Operators now interact with AI like this, "Why is the formation uneven today?"

And the AI replies, "Three contributing factors: higher lignin content in this morning's pulp delivery, a 2.3°C variation in the headbox temperature, and wear patterns on the forming fabric installed last month. Based on similar past conditions, I suggest adjusting the jet-to-wire ratio by 0.05 and increasing the first dryer section temperature by 4°C."

The results?

- 37% less water use
- 28% reduction in energy
- 32% increase in output

And new operators? They now reach proficiency in months instead of years. This is how AI and human expertise multiply each other.

The Agentic AI:

- Monitors thousands of variables
- Interacts with operators use everyday language
- Bridges generational knowledge gaps
- Providing contextualized answers in real-time
- Empowers and augments the skill of the operator

USE CASE EXAMPLE 2: AGENTIC AI IN SUSTAINABLE SOURCING

Supply chain managers simulate scenarios with AI like this, "What happens if we shift fiber sourcing from Northern Europe?"

AI responds, "That reduces emissions by 14% but raises transport costs by 9%. An alternate network achieves similar environmental gains, with only a 3% cost increase."

The impact?

- 37% water reduction
- 28% energy savings
- 32% output gains.

This kind of modeling turns firefighting into foresight. It helps managers lead with confidence, sustainability, and agility—at the same time.

New hires are trained in months. AI doesn't replace skill—it multiplies it.

The Agentic AI:

- Models future sourcing, emissions, and cost scenarios
- Visualizes trade-offs and ripple effects
- Suggests optimal paths balancing carbon, cost, and resilience
- Empowers sustainable planning

USE CASE EXAMPLE 3: AGENTIC AI ALIGNING PROFIT AND ESG

Boardroom executives are using AI across the full value chain.

They say, "We need to maximize EBITDA this quarter while holding to our no-deforestation policy and cutting Scope 3 emissions by 15%."

AI proposes, "Adjust pulping chemistry in Mill 3, Increase fiber yield, Reduce energy cost, Lower effluent discharge, All while maintaining product specs.

The Result?

- An 18% profit increase—while advancing sustainability. And for the first time, every team sees how their decisions affect the whole chain.
- The AI shows the emissions savings, cost increase, and suggests an alternative network with similar gains but lower costs. Supply chains become resilient and regenerative, not just reactive.
- The impact? 37% water reduction, 28% energy savings, 32% output gains. New hires are trained in months. AI doesn't replace skill—it multiplies it.

The Agentic AI:

- Supports multi-objective optimization
- Responds to EBITDA, no-deforestation, and carbon goals
- Recommends process, logistics, and chemistry changes
- Improves profitability and environmental outcomes

ADJACENT INDUSTRIES ARE RAPIDLY ADOPTING AGENTIC AI

Previously technology-conservative industries are leap-frogging:

Water Utilities and Fresh Water Catchment

- Optimising chemical usage and environmental damage
- Forecasting severe weather events that overload purification and sewerage systems
- Sustainable water catchment and dam management

Traditional Power Generation

- Minimizing carbon footprint
- Energy efficiency through accurate demand forecasting and maintenance shutdown management
- Optimal use of coal vs renewable during the energy transition phase

Mining and Mineral Processing

- Pit-to-Port value-chain optimization
- Economic optimum operations
- Quality forecasting and optimizing
- Optimal use of chemicals and other input costs

COMPLIANCE AS CATALYST

AI systems must meet global standards - the implementation of these AI-human systems occurs within an evolving regulatory framework that both constrains and enables innovation.

Leading firms co-develop innovation-friendly governance

Compliance boosts credibility and market access

THE FUTURE IS COLLABORATIVE

- AI that collaborates with people
  - Augmenting expertise
  - Accelerating learning
  - Solving problems no one could solve alone
- AI empowers—not replaces—human expertise
- Solves for productivity, sustainability, and workforce resilience
- Transformation starts with human-AI trust
- The organizations that acts now will lead tomorrow

THANK YOU FOR LISTENING. I AM HAPPY TO TAKE ANY QUESTIONS NOW.

Scan the QR Code for my contact details