HEXAGON
PPM

WHITE PAPER

FIVE CRUCIAL STEPS TO EMPOWERING FIELD WORKERS WITH THE INDUSTRIAL INTERNET OF THINGS (IIOT)

Introduction

The core of the Industrial Internet of Things is creating an ecosystem of sensors, detectors, automation, software, and other “Big Data” analytics tools, which enable an accelerated, deep learning of existing operations.

It’s about reversing knowledge drain and expanding knowledge beyond human silos and to all workers.

This has a range of strategic advantages for your organisation and with the proper data integrations and solid information management, the executive can make enterprise-wide operational improvements.

This document will focus on improving productivity across your field workers through IIoT, which if implemented correctly across two tactical disciplines – shift handover and mobility – can reduce operational expenditure between
7% to 8% and minimise the impact of industrial accidents and regulatory fines.

Why

Executive Purpose

Generally, if small control failures and minimised issues are left unchecked, they can lead to greater risks, firm-wide failures and major unplanned shutdowns. These can derail any executive from achieving their desired outcomes, including quarterly financial goals. However, having real-time oversight and reporting into operations provides a platform to combat these issues.

At a broader level, one of the core principles of operations management is driving improvement and efficiency. Accordingly, operations executives are charged with finding, deploying, and onboarding technological solutions that help remove roadblocks to business outcomes.

At a smaller scale, processes are often manual in immature organisations. This can range from having daily operation activities and plans mapped out onto a whiteboard to using excel sheets to track incident reports. While Excel is an improvement over the whiteboard, without a controlled single source of truth, organisations tend to experience process improvement in silos via Excel.

This phenomenon means crucial business information is contained across a few key employees. Therefore, knowledge is at risk of being lost as these workers approach retirement or, if those workers prove effective, they then become headhunting targets from the

competition. Operations leaders are charged with breaking down these knowledge silos and creating an environment where information can be easily shared across the workforce.

According to Human Factors Elements Missing from Process Safety Management (PSM) by the Process Improvement Institute, 99% of fatalities on-site begin with human errors, while anywhere from 40% to 43% of industrial accidents are related to manual process handovers. At the same time, 45% of manual field workers use very little technology.

Digitising operations and turning your workforce into a "human sensor" reduces field incidents and meets compliance regulations, allowing you to also minimise your risk tolerance.

99% of accidental losses (except for natural disasters) begin with a human error

Supported by data from more than 1500 investigations

Root causes of accidents are management system weaknesses

Center for Chemical Process Safety, American Institute for Chemical Engineers, "Guidelines for Investigating Chemical Process Incidents," 2003 – OSHA agrees

Weak Management Systems → Human Error → Accidents

WHAT

Long-term

Operations leaders who can create a framework for using The Industrial Internet of Things (IIoT) are well positioned to give themselves a competitive advantage in the next two years. General Electric found in their Digital Industrial Revolution Index that 64% of power and utilities companies will rely on IIoT as a core component of their digital transformation, while 58% of manufacturing companies agreed.

This means operation leaders must create a long-term vision through the short-term benefits of empowering field workers. This means identifying gaps or roadblocks in process that can be filled with technology and moving your organisation toward a fully-integrated information management system that can reliably relay structured data to field workers, who can then feed back into the system in real time via a mobile device.

As such, IIoT will pave the way for concepts such as Intelligent Enterprise (IE), Operational Intelligence (OI) and Predictive Maintenance. Starting today will be crucial to keeping industrial organisations competitive over the next decade.

Short-term

While concepts like IE, OI and Predictive Maintenance are rather new, or just becoming functional, industrial businesses can still start seeing benefits from IIoT in the short-term. Mobile computing, Information Management are all very much ubiquitous and play a role in executing on IIoT architecture.

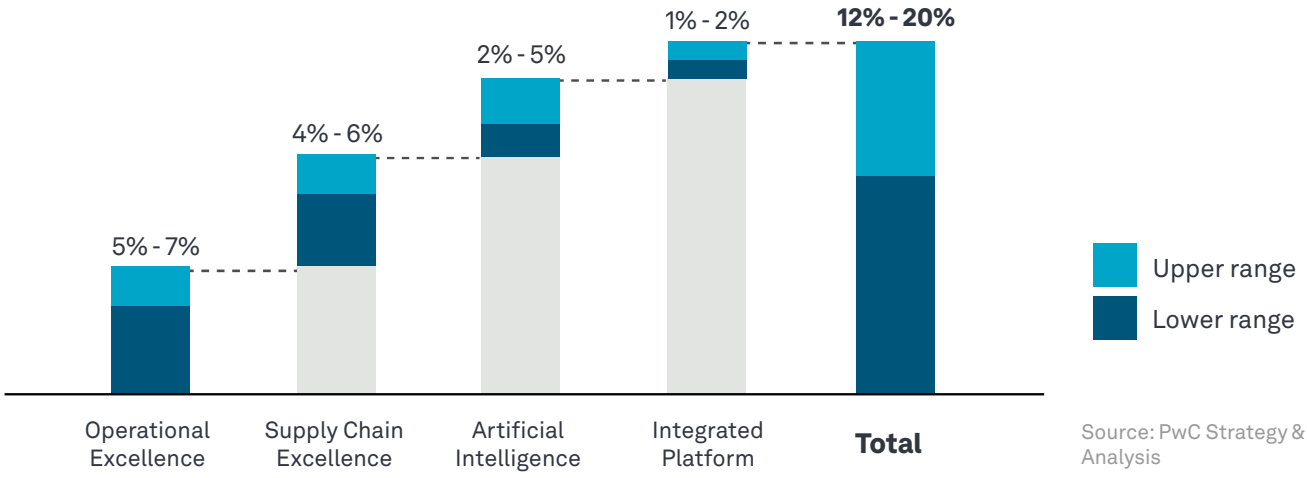
For example, most field workers own a mobile device and are familiar with using mobile applications. As such, software solutions become the most readily available opportunity for companies to capitalise on the IIoT.

A field worker can electronically log a problem via their device, which informs the next shift of said problem and reduces the risk of problems not being manually logged.

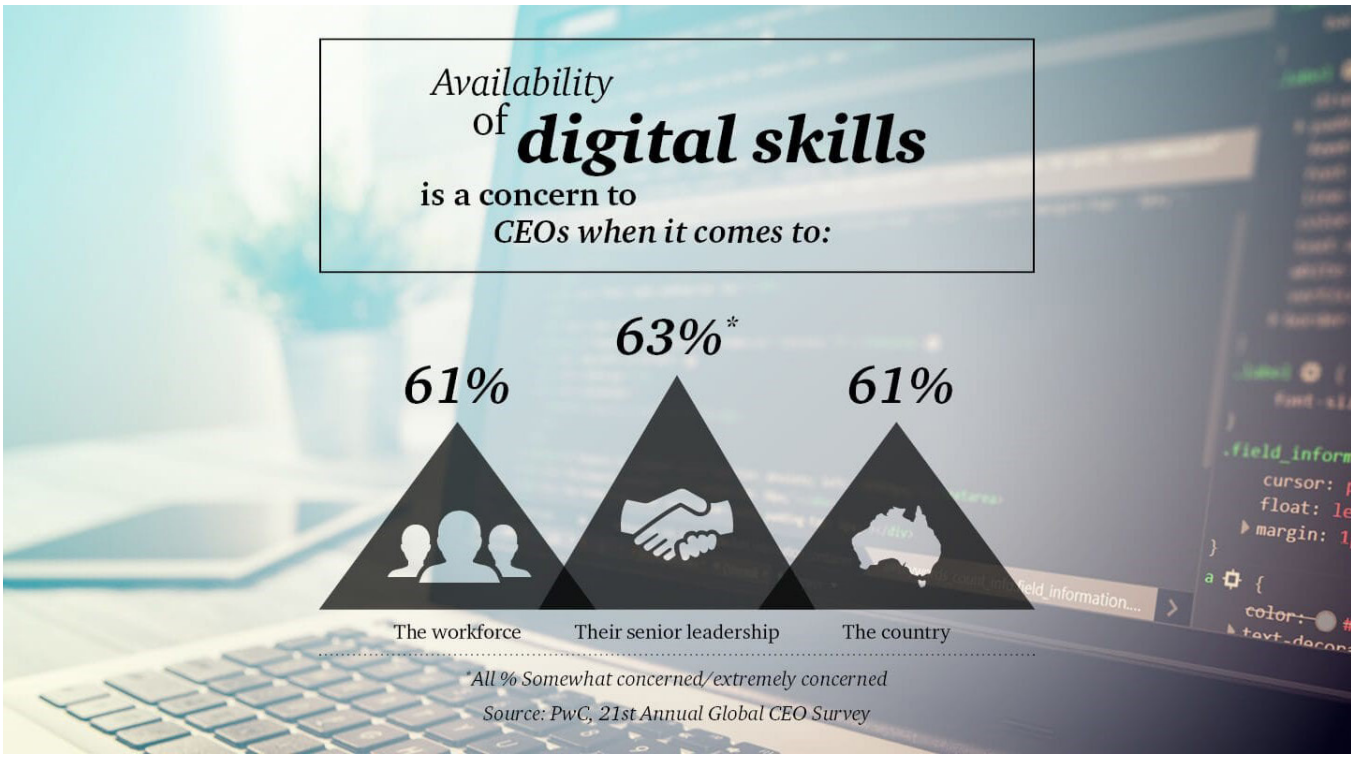
Just by creating a synchronised, single source of truth which all field workers can access in day-to-day operations can have reliable business outcomes in productivity and cost reductions.

Exhibit 1

Efficiency increase from digitization (% saving on total operating expenditure)



Source: PwC Strategy & Analysis



HOW

How to Manage Change

The problem most businesses face is in implementing technology – optimising processes to include the use of reliable technology. Demystifying these barriers is key to success, and following these five steps will help your organisation on the path of IIoT success.

1 | START WITH THE WORKERS

Availability of digital skills is a concern to CEOs when it comes to:

- 61% concerned about the workforce
- 63% concerned about their senior leadership

Source: PwC: 21st Annual Global CEO Survey

Most workers and their leaders are concerned when it comes to the availability of digital skills. What do they need to get more from their job? First, the focus must be on the employee before productivity. Productivity is a byproduct of increasing an employee's sense of worth and value. Engaged and empowered workers are more productive.

Hold a workshop with Field Director, Operations & Maintenance Managers and other relevant stakeholders. Discover what will help them do their jobs more effectively and really listen.

Align business strategy: Ensure that automation and digitisation opportunities support the business strategy, shaping a vision on where the company would like to be in next five years. This will help determine what capabilities are required to deliver that strategy without overwhelming the strategy with unnecessary digitisation.

Design a future-fit workforce and workspace: Identify the field tasks which automation and digital will impact, including the implications for those jobs – should they be kept, culled or merged – and then look at how the organisation's culture needs to evolve in response.

Identify and close the skill gaps: Find the balance between reskilling, upskilling and repurposing versus bringing in new skills, technology and knowledge as roles evolve to fit the new culture and strategy.

2 | IDENTIFY KPIs

What are the business objectives you hope to achieve through digitising operations? For example, are you trying to maximize operating efficiency to reduce costs? Or trying to improve the health and safety of workers? Perhaps digitisation and data collection could open new sources of revenue by providing new services or products – make sure your objectives are aligned to your KPIs.

Four Good Yardsticks

1. What is being measured? An example might be the percentage of field worker interactions that are virtual/ digital.
2. Where are we today? How many incidents are electronically logged or how many field workers use digital applications or devices?
3. What is our target goal? Is this full digital adoption? Or improved safety metrics? Or perhaps better reliability or maintenance times.
4. What is our desired business outcome/benefit? For example, 100% incidents electronically logged and 8% lower operation cost.

Value at stake: Connected Worker

(All figures cumulative, 2016-2025)

$100 billion
Potential value addition for industry

13%
Estimated reduction in accidents and injuries

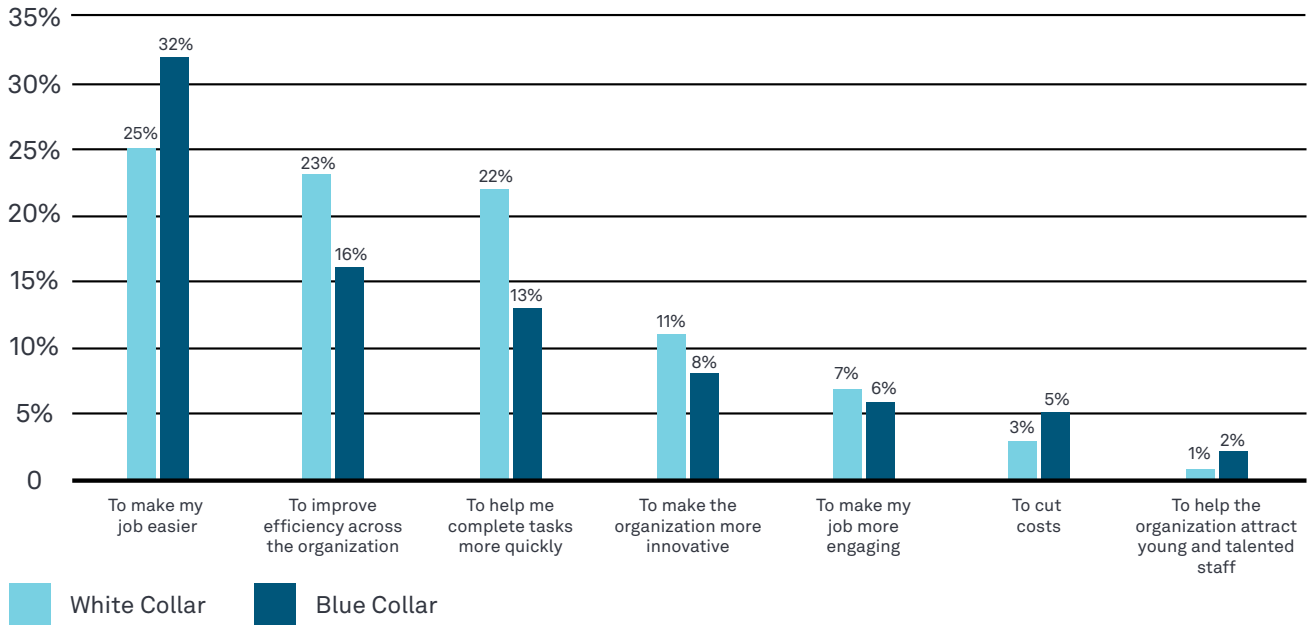
76,000 jobs
Estimated number of jobs displaced

World Economic Forum
Digital Transformation Initiative Oil and Gas Industry
January 2017

NOTE: Your workforce will likely know operations and maintenance very well but struggle with adapting to a non-traditional environment. Hiring new expertise, or bringing a vendor's expertise on secondment, in digital areas and fostering a collaborative environment through HR will keep the transition smooth.

Figure 5

Preferred Impact of Technology



Examples of KPIs in Four Core Areas of IIoT and Operations

Safety

- Training (classroom or 1-on-1 mentoring)
- Employee audits and observations
- Near-misses
- Safety meetings (shift or company-wide)

Productivity

- Reduction in paperwork
- Time on Tools
- FTFR, MFFR, Backlog

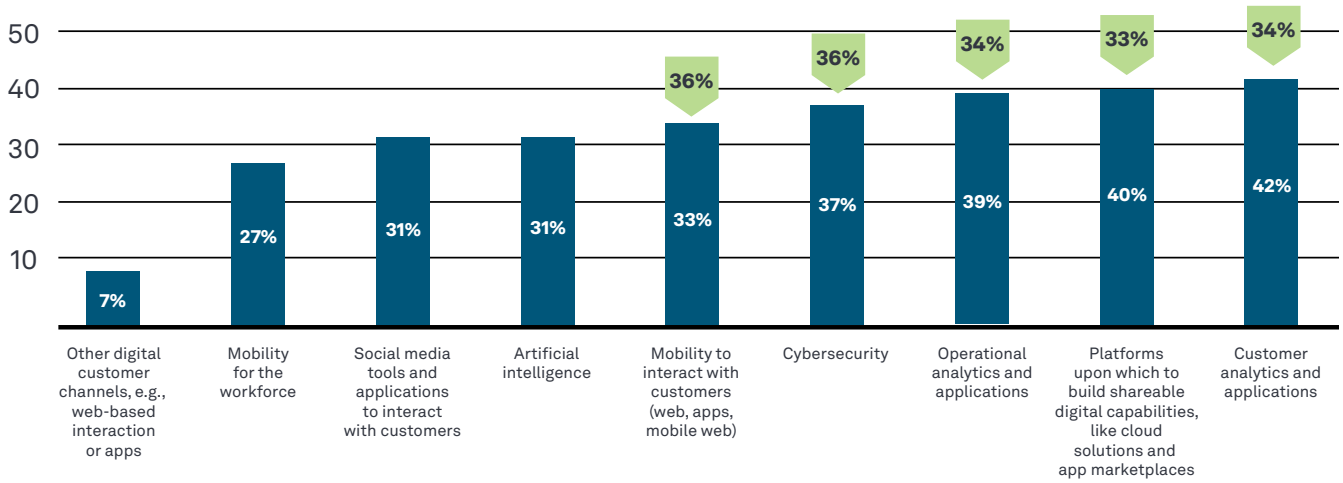
Reliability

- Overall Equipment Effectiveness or Total Effective Equipment Performance
- Maintenance Cost / replacement asset value as a percentage
- Mean Time Between Failures

Employee Satisfaction

- Employee surveys
  - How valued they feel as an employee?
  - How satisfied they are with their work/ life balance?
  - How they feel about their career prospects?
- Employee Net Promoter Score
  - "How likely is it that you would recommend working at our company to a friend or colleague?" Generally, the question is answered on a scale from 0 to 10, where anyone answering 0 to 6 considered a detractor, 7 and 8 considered passive, and 9 and 10 respondents are considered promoters.

For Asset-Intensive Companies*, the top five most promising digital technologies match the capabilities most in need of improvement



Base: All respondents

Digital technologies offering most potential for business transformation over the next five years
(Top five; in percentage)

Digital capabilities most in need of improvement
(Top five; in percentage of respondents indicating fair amount/a lot of improvement needed)

Asset Intensive Companies include companies from chemicals, oil and gas, metals and mining and utilites sectors
Source: Accenture 2016 Resources CIO Survey.*

3 | UNDERSTAND THE ENVIRONMENT

We often find great solutions and have good ideas, but they aren't realistic in a given field. Scope the environment before deploying a solution. For example, in Oil and Gas, take the conditions workers must carry out their jobs: can they use their hands and access devices that require a light touch to operate or do they need a heads-up display? Are they working in dangerous or dark environments where conditions might affect the function or safety of their devices?

At the same time, map and understand existing processes – looks for opportunities to optimise and potential weak links to improve with technology. An excellent example of this is during shift handover – find out the barriers to incident reports or logs. Then improve them with compulsory updates through software.

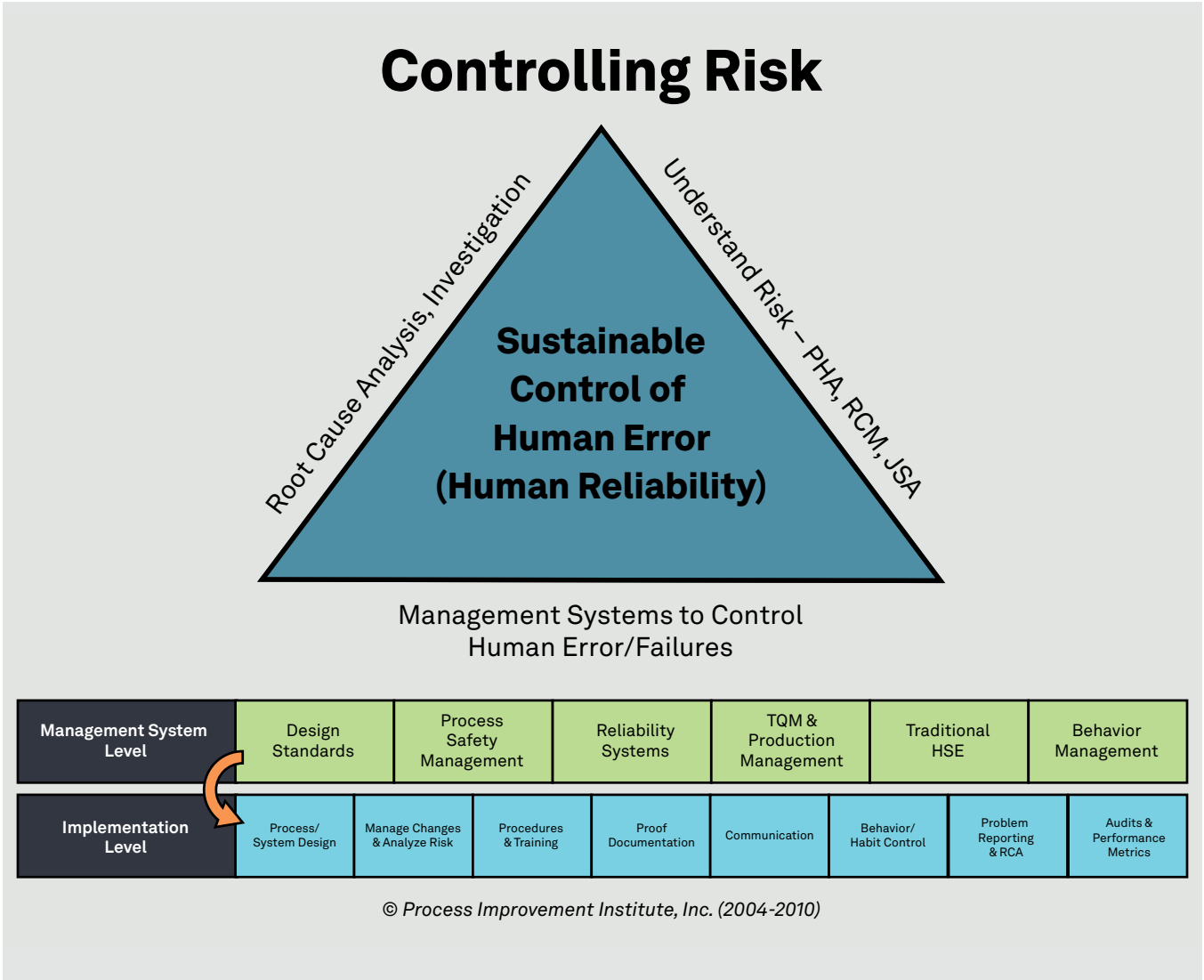
You must understand the reality before digitisation can begin.

4 | UNITE YOUR DATA, MANAGE YOUR INFORMATION

Key questions to ask that will help you understand your maturity.

For empowering field workers

- Can information that is available in the existing environment be pushed to devices to enable workers to do their jobs?
- Are we all working from the same instance – are we duplicating effort or working in silos?
- Can manual or hardcopies be uploaded into a digital environment?
- Can all this information be accessed through one platform?



For reporting

- How can we use data from assets in the existing environment, and how can we bring in new data to help deliver value in the cases identified earlier?
- Can the data be easily managed to create executive reports on an almost real-time basis?

For Information Management Maturity

- Do we have internal expertise to bring all our information into one single source of truth, or will we need to bring in a consultant on Information Management / Data Integration?
- How secure is our information – are we protected from external threats, such as malware, spoofing and theft?
- Accessibility – if a plant blew up today, could we compile the information to rebuild it tomorrow?

5 | BRING IT TOGETHER

Enabling workers early in the process makes sure that we're creating technology solutions and enabling workers in a way that's realistic and comfortable for them to adopt. Start small, pilot an idea to drive learning and help refinement in the environment before scaling up.

LEVERAGING SOLUTIONS FOR CONTROLLING RISK & WORKER PRODUCTIVITY

Depending on your organisation's maturity, you may want to look at both your operations management system and implementation levels.

Operations Information Management Issues

If your problems are in accessing information and reporting – or a lack of credibility in your risk and productivity data – then the first challenge is bringing a reliable operations management system to your company. This will involve an audit of your current system to make sure process safety, reliability, product management and worker behaviour are seamlessly integrated. Hexagon PPM has expertise in helping organisation diagnose these problems and providing management systems, such as Hexagon PPM **Asset Lifecycle Information Management** Solutions , to ensure information can flow across your architecture to the right place at the right time.

Implementation Issues

Organisations with visibility problems, or experiencing low productivity or high unforeseen accidents, may want to optimise their implementation level. This will work in tandem with a solid operations management layer and requires operations management software. Companies who need operations software often encounter worker mobility & productivity issues, high vendor configuration costs or difficulty in scaling operations across the enterprise. Hexagon PPM's **j5 International** helps overcome these challenges and brings an organisation closer to true operational and shift excellence.

High-maturity Enterprise Solutions

Once both management systems and implementation levels are optimised, mature organisations can look to enterprise-wide solutions that layer on-top of existing platforms, which help companies move toward predictive maintenance, mobility management and enterprise intelligence with cutting-edge platforms, such as **Hexagon Xalt**.

About Hexagon

Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous — ensuring a scalable, sustainable future.

Hexagon's PPM division empowers its clients to transform unstructured information into a smart digital asset to visualize, build and manage structures and facilities of all complexities, ensuring safe and efficient operation throughout the entire lifecycle.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 20,000 employees in 50 countries and net sales of approximately 3.8bn EUR. Learn more at hexagon.com and follow us @HexagonAB.