



Whitepaper

How a digital manufacturing platform increases your Overall Equipment Effectiveness (OEE)

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Introduction

Now COVID-19 has made it even more pressing to switch to digital, it is high time to say goodbye to manual, paper-based workflows in mass production factories. Digitization is the way forward to Industry 4.0. Because that's the key to an Overall Equipment Effectiveness (OEE) of world-class level (85%). In reality, [most plants today have an OEE closer to 60%](#). We believe the solution lies in a digital manufacturing platform that supports all plant work processes and utilizes advanced technologies like Machine Learning, IoT, AI and mobile. In this whitepaper, we will show you how such a digital manufacturing platform could work by describing three manufacturing processes: Task Management, Deviation Management and Root Cause Analysis, and how digitalization of these processes can help you achieve an OEE of world-class level.





Task Management

Task management sounds simple, but when you consider the preciseness to which factory operators need to work (e.g. achieving perfection in a 100-year old beverage recipe known for its consistent taste, produced at mass scale), standardized and step-by-step work instructions available via mobile device can make all the difference. One plant in China implemented digital process recipe management and it's not surprising that they achieved a [15% increase in operational efficiency](#).

Predefined, step-by-step digital work instructions ensure jobs are executed correctly, the same way every time. This of course significantly improves production quality, but it also increases uptime. [With 23% of unplanned downtime caused by human error](#), you can really minimize the risk by defining a specific work process and having operators click through each step, verifying it was done a certain way. In a very simple use case of task management, McKinsey cited that digitizing SOPs can really help maximize resource productivity and efficiency as it has proven to lead to an

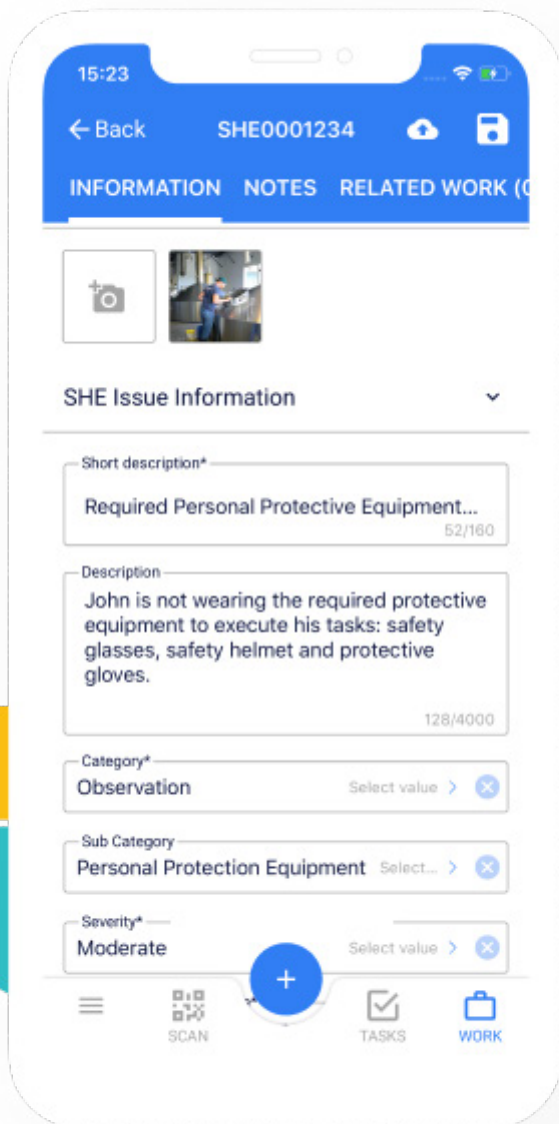
[increase in available equipment and an 85% decrease in paper work and transcription](#).

If that's not enough, establishing standard work instructions and making them accessible to all your workers via mobile can save tremendous amounts of time in your operator onboarding and continuous training efforts.

Empowering your workers with a mobile, digital task management tool contributes to positive changes that move the OEE needle in several different ways. Another benefit of mobile task management allows tasks to be scheduled and assigned in a way that ensures jobs are created and scheduled before an issue is likely to occur. If you consider that [70% of companies don't know when equipment is due for maintenance/upgrade](#), a task management tool to set the frequency and assign, say, routine maintenance tasks for Line A, can allow your workers to focus on continuous improvement efforts instead of double that time fighting fires.

Deviation Management

Digitizing Deviation Management via a centralized smart platform speeds up the problem-solving process of deviations significantly. Because digital registration of deviations yields valuable, actionable data that can be used for continuous improvement. We've seen mobile deviation management in action at a large beverage manufacturer with operations in 70 countries. Mean Time to Resolve (MTTR) went from 26 to just 6 days. If you consider that [one hour of downtime can cost a plant up to \\$260,000](#), that's a huge win! Even for a single incident, it's a huge cost savings on so many levels.



The screenshot displays a mobile application interface for reporting a deviation. At the top, the status bar shows the time 15:23 and various icons. Below that, a blue header bar contains a back arrow, the ID 'SHE0001234', and a save icon. A navigation bar below the header has tabs for 'INFORMATION', 'NOTES', and 'RELATED WORK (0)'. The main content area includes a camera icon and a photo of a worker. Below this is a section titled 'SHE Issue Information' with a dropdown arrow. The form contains several input fields: 'Short description*' with the text 'Required Personal Protective Equipment...' and a character count '52/160'; 'Description' with the text 'John is not wearing the required protective equipment to execute his tasks: safety glasses, safety helmet and protective gloves.' and a character count '128/4000'; 'Category*' with the value 'Observation' and a 'Select value >' button; 'Sub Category' with the value 'Personal Protection Equipment' and a 'Select... >' button; and 'Severity*' with the value 'Moderate' and a 'Select value >' button. At the bottom, there is a navigation bar with icons for 'SCAN', 'TASKS', and 'WORK', and a central blue circular button with a white plus sign.

Prevent deviations from happening in the first place

How it works

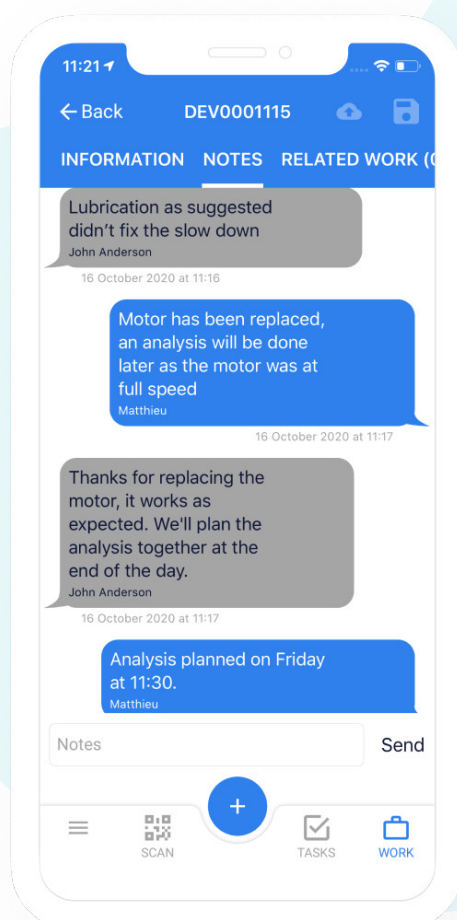
A worker spots a label that has been placed upside-down by the labeler. Once arrived at the labeler, he scans the equipment QR code with his mobile device, granting him instant access to the entire equipment history, fixes and manuals. But safety first! Once he has filled out the SHE checklist and has taken the necessary precautions, the worker starts to resolve the deviation. He takes a photo, registers the deviation via his mobile device and starts investigating the deviation. With the help of Machine Learning, the system browses through the knowledge base and presents all possible solutions based on historical data. This knowledge base is built by constantly registering deviations across your production plants. New deviation data is fed into the centralized database every day, making it smarter over time. If you have multiple plants around the world, the platform can ensure all plants have access to the same knowledge anywhere in the world.

Next to suggested solutions, a worker also needs access to digitized manuals because those are great sources for solving deviations. A while ago, McKinsey came out with a study that found workers, in general, [spend around 20% of their time looking for information](#). But factory workers aren't exactly sitting at a desktop with a search engine, so you could assume it would cost this line of work even more time. Thus, anything you can do to decrease the amount of time workers spend searching for information on the shop floor will positively impact your overall productivity.

Information presentation & chat function

When transforming manuals, slicing them up in categories using a Q&A style will help the worker quickly find the right information. Each question narrows down the options, presenting solutions based on the answers given. But what if the worker really does not know how to solve the deviation? He should then be able to ask for support via a mobile chat function, looping in an engineer or a supervisor who may have previous experience with this same issue. A designated person receives the support request and helps the worker solve the deviation.

Centralized registration of deviations brings along another major benefit. It allows you to spot deviation patterns across factories. After a digital root cause analysis procedure, you can solve the deviation once and for all. Eliminating deviation after deviation like this can reduce your total machine downtime by 30 to 50% (Figure 1), accompanied by an [extended equipment lifetime of 20 to 40%](#). And that does not even include the potential labor and cost savings this will bring you!



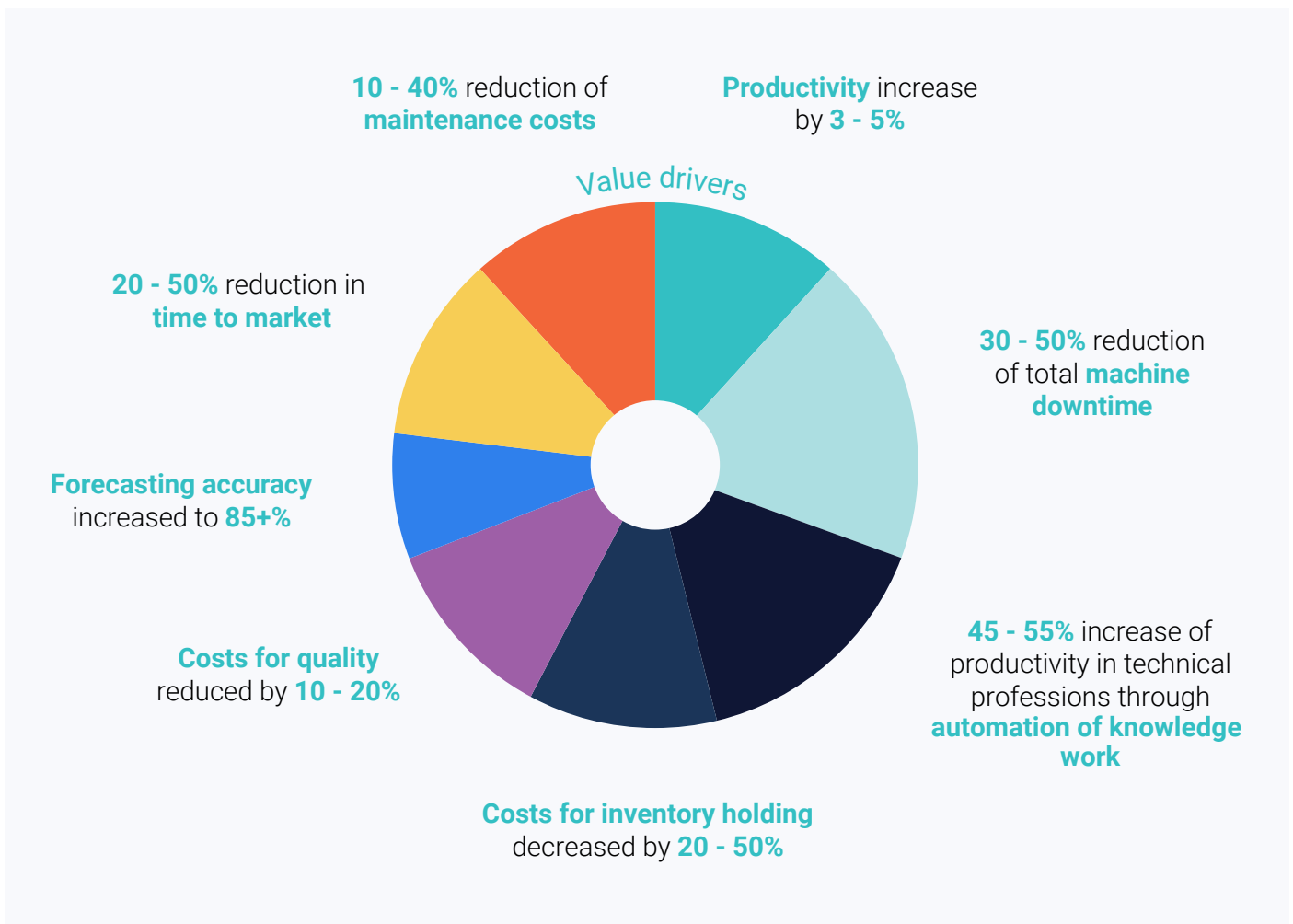


Figure 1. Quantification of value drivers for digitization in manufacturing¹

Source: [McKinsey](#)

Root Cause Analysis

A powerful way to minimize deviations and positively influence your OEE is through digital Root Cause Analysis (RCA). Getting down to the root of the problem makes sure you avoid repetition. Repeat problems lead to waste in your plant—in the form of scrap, time and resources spent on fixing the problem, downtime and product rework. Eliminating waste always entails productivity benefits.

How it works

After detection, the deviation is usually temporarily fixed. At that very moment, you start the digital RCA procedure. You form an (online) team and start a digital 5Why Analysis, allowing everyone to participate, even remotely, and discover more possible why's. Asking supplementary questions will finally lead you to the root

cause and how to solve it. If the solution does not work once implemented, you start the whole cycle again until you find the real root cause.

Benefits

When your engineers collaborate on root causes remotely via a single database, there is no need to fly your engineers or safety experts all over the world anymore, potentially unlocking tremendous cost savings in time, flight, working hours and accommodation. One of our customers using mobile deviation management experienced a 24% decrease in engineer travel time. Can you imagine the annual cost savings that resulted in? It's a lot! Furthermore, if you combine RCA with IoT technology and Machine Learning, you can even prevent many deviations from happening in the first place.

Recap

A centralized digital manufacturing platform leveraging Industry 4.0 technologies like mobile, IoT, QR code scanning and Machine Learning can really improve your OEE.

The key to realizing this value is to ensure your digitalization (or 4.0) strategy is equally focused on ensuring your operators have a platform—with a user-friendly, and preferably mobile interface—to make use of the data and knowledge these technologies provide.

Where to go from here? The first step in the path to improving OEE is to measure where you currently stand. Starting with a plan to collect and visualize data to calculate OEE performance is always a good idea. For one plant in Dubai, having a digital dashboard to monitor OEE performance [resulted in an OEE increase of 15%](#). You must measure to know, and know to improve.





4Industry

4Industry is a digital manufacturing operating system (DMOS) aimed at increasing your Operational Equipment Effectiveness (OEE) and providing a safer work environment. It boosts the employee experience through mobile and paperless workflows, taking your factory productivity to the next level. Based on Total Productive Maintenance (TPM), 5S, Six Sigma and Lean Manufacturing, our platform supports six specific manufacturing processes: Autonomous Maintenance, Planned Maintenance, Quality Maintenance, Early Equipment Maintenance, Safety, Health & Environment (SHE), and Focused Improvement.

About App4mation

App4mation is an innovative development partner of revolutionary workplace applications. We build user-friendly and robust digital applications with high user adoption, empowering people to make a difference in their work. As a true technology expert, we utilize cutting-edge technologies like IoT and mobile to digitize, improve and transform work processes—helping businesses to meet challenging goals.

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If you'd like to know more about how to increase your OEE with our smart, modular and customizable digital manufacturing platform, send us a message via info@app4mation.com, give us a call on +31 (0)30 76 02 670 or go to www.4industry.com.

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