POV

New-age Manufacturing:
Personas of Future on the Shop Floor

Author
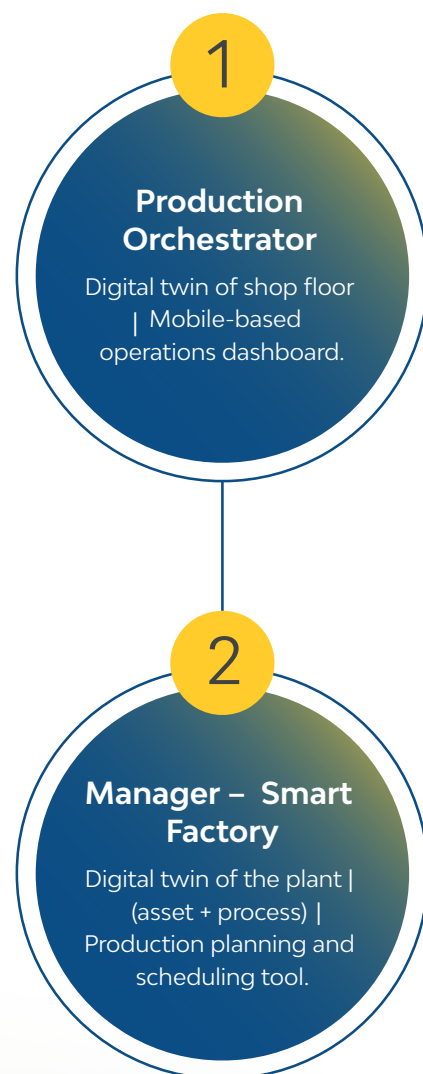**Raman Kartik Iyer**
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New-age Manufacturing: Personas of Future on the Shop Floor

The global manufacturing industry is undergoing transformation, which is mainly driven by automation and changes to shop floor system landscape. Introduction of robots to the shop floor, Industry 4.0 capability interventions and technology-savvy, new workforce looking for seamless digital experiences will accelerate operational efficiency on the shop-floor, while maintaining the new safety and social distancing norms.

Manufacturing plants of most enterprises are moving towards autonomous operations, which will help bring in greater efficiency on the shop floor across functions. This move will take the plant operations to a level, where they can operate with a lesser number of plant floor personnel at same throughput. The need to introduce new products in the market and repurpose the manufacturing plant accordingly without affecting the cost and quality, is also compelling the enterprises to adopt new ways of working and reskill and upskill the work force.

Here's a quick snapshot of some shop-floor personas of the future. The PoV also provides details of digital tools these presona's will leverage to perform their day-to-day tasks in a productive manner.

1

Production Orchestrator

Digital twin of shop floor | Mobile-based operations dashboard.

2

Manager – Smart Factory

Digital twin of the plant | (asset + process) | Production planning and scheduling tool.

3

Plant Digital Offering Manager

Industrial IoT platform solution | Catalog of sensor, gateway and technology solution used across plants.

6

AR Engineer – Maintenance

AR-based maintenance and remote assistance tool | Monitoring and diagnostics tool.

4

Autonomous Site Operations Supervisor

Site Command Center (SCC) to monitor OT asset, systems and business KPIs | Edge analytics for remote diagnostics.

7

Supply Chain Specialist - Smart Production Operations

Tool to forecast customer demand and have an end-to-end and granular view for timely decision.

5

Robotics Automation Specialist – Manufacturing

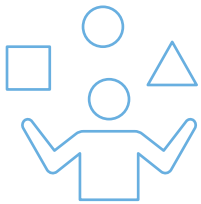Remote programming/ diagnostics of robots/ cobots/AGV/ IoT gateways.

8

Digital Work Center Operator

Digital Work Instruction (DWI) | Touchless operations at production line.

1

Current Persona
Shift Supervisor

Future Persona
Production Orchestrator

Activities

Take paperless handover from previous shift with minimal downtime.

Take decisions (along with other stakeholders) on interventions for achieving production targets based on real-time production and planning & scheduling, considering constraints across the value chain.

Simulate "what if" scenarios based on the data available.

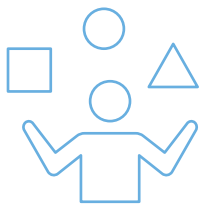### Digital tools and productivity enablers

Have access to digital twin of shop floor with real-time view of the production target to be met in the shift, manpower available, supply/raw material available (any constraints), production issues from previous shift, health of machines/equipment and insights on proactive intervention required to prevent any production stoppages.

Mobile-based operations dashboard for access to production and quality KPIs on-the-move.

2

Current Persona
Plant Manager

Future Persona
Manager – Smart Factory

Activities

Manage the factory operation and production output with a real-time view of production operations and all the ancillary units at the plant like utility – water and power, waste water treatment, power generation, etc.

Optimize the production based on production orders to be achieved in a shift, by leveraging an end- to-end view of supply chain - raw material constraints (if any), operators available (with their skillset and certification), scheduled asset maintenance and health of all the shop floor asset.

Digital tools and productivity enablers

Have access to the digital twin of the plant (production shop floor, utility – water / electricity / power generated, inbound and outbound logistics, warehouse, quality lab, etc.) from both process and operations standpoint. The digital twin is integrated with inbound logistics systems for visibility of raw material.

The digital twin process helps in simulating and identifying the bottlenecks on the manufacturing shop floor that helps in taking necessary intervention to improve the first pass yield, in-process quality and end of process quality.

Have real-time visibility in the production volume to enable informed decisions and corrective actions to meet the production targets.

Production planning and scheduling tool with latest information on manpower availability, raw material, asset availability, any other constraints on shop floor.

Plan for production efficiency while new product variants are manufactured on the shop floor.

3

Current Persona
Plant IT Manager

Future Persona
Plant Digital Offering Manager

Activities

Responsible for introducing new technology capabilities based on the need of plant business users, for example: new predictive maintenance model for shop floor asset, augmented reality app for additional maintenance and part replacement procedures, additional virtual reality training courses for shop floor personnel.

Introduce new technology solution based on social distancing norms on shop floor and making the production facility touchless to maximum extent possible. For example:

- Facial recognition for logging in at the work center for operator instead of manual login/authentication.
- Digital work instruction solution for operators at the work center instead of the physical paper processes for having the instruction and capturing the operator confirmation based on actual process followed.

Manage a flexible team of data scientists, device engineers, IoT platform architects, developers.

Ensure cyber security compliance.

Digital tools and productivity enablers

Data-centric IoT platform, which can orchestrate new workflows based on use cases by leveraging the tools (technology components) that are part of the platform.

Access to smart manufacturing roadmap for the plant.

Access to technology initiatives currently under implementation or already implemented at other plants that can be leveraged.
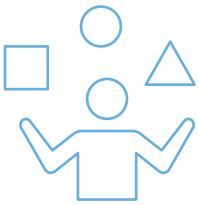
4

Current Persona

Site Supervisor (for boundaryless industry verticals) – O&G, Utility, Mining and Port Operations

Future Persona

Autonomous Site Operations Supervisor

Activities

Responsible for site operations with limited field crew.

Use platform for a real-time view of site operations including data from OT systems for visibility to system/asset health and business KPIs.

Uses data and images from drone for remote site inspection, image analytics and monitoring.

Digital tools and productivity enablers

Given the boundaryless operations and remoteness of asset, leverage wireless connectivity and edge analytics for necessary technology intervention based on the alarm raised by edge devices.

Leverages Site Command Center (SCC) solution for a real-time view of site operations.

An extension of SCC would be Remote Operations Center (ROC) – data from OT layer like system health and business process information for operators on the enterprise side.
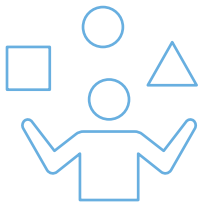
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Current Persona
Instrumentation Engineer

Future Persona
Robotics Automation Specialist – Manufacturing

Activities

Responsible for the configuration of shop floor automation tools like robots and cobots.

Maintenance of IoT-based sensor and gateways used as part of smart manufacturing operations.

Work closely with Plant Digital Offering Manager for implementation of new OT-centric shop floor connectivity solution for the Brownfield setup.

Leverage latest networking technology (Ethernet, Wi-Fi) for shop floor devices connectivity.

Digital tools and productivity enablers

Solution for programming and diagnostics of robots and cobots at the graduality of shifts and days based on the out of production plan and schedule.

Monitoring and diagnostics program for track and trace tool for personnel safety and asset (tooling component, sub assembly components and final product).
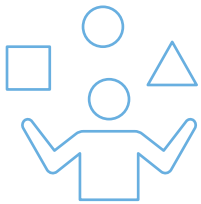
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6

Current Persona
Maintenance Engineer

Future Persona
AR Engineer – Maintenance

Activities

Augmented Reality (AR)-based solution for monitoring real-time health of asset/production line based on sensor data superimposed on 3D model of the physical asset.

Access to historical data trends and maintenance records.

Remote collaboration and assistance tool for access to expert guidance on maintenance work and insight.

Digital tools and productivity enablers

Has access to AR-based maintenance tools, analytical models and deep insights that help in taking the corrective action.

Seamlessly collaborates with remote experts for resolving an issue – remote assistance.

First-level of diagnostic and localization of problem done by AI models and knowledge models. These insights, along with previous maintenance done on similar issue/asset across plants in the form of Body of Knowledge (BOK) are readily available that can be viewed for the next level of validation and necessary intervention to be made.
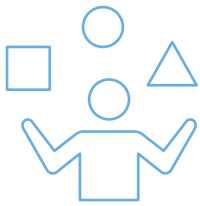
7

Current Persona
Supply Chain / Procurement Specialist

Future Persona
Supply Chain Specialist – Smart Production Operations

Activities

A platform for providing an end-to-end view of supply chain - right from procurement of material, inventory of raw materials, to current production capacity of plants and actual production, warehouse stock with final product and outbound logistics.

Able to forecast the customer demand based on market variables related to seasonality of demand, market trends, etc.

Comprehensive IT-OT integration for real-time visibility of plant production at enterprise level.

Digital tools and productivity enablers

Perform planning at granularity of weeks/days based on demand and supply data.

Integrate the enterprise side planning to plant level production planning and scheduling for improved efficiency of plant.

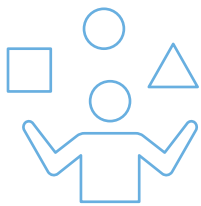End-to-end visibility from the supplier's place to in-plant storage to point of consumption.

8

Current Persona
Line/Work center Operator

Future Persona
Digital Work Center Operator

Activities

Perform tasks/assembly operation at work center using Digital Work Instruction (DWI) solution.

Paperless task workflow management leading to efficiency gains and reduced errors.

Digital tools and productivity enablers

Digital Work Instruction (DWI) solution providing paperless operations at the work center.

Have access to the tool to seek help if unable to complete the operation following the Standard Operating Procedure (SOP).

Summary

As manufacturing organizations undergo transformation by digitizing the core and accelerating their Industry 4.0 adoption, the skills that are relevant today need to be further expanded by shop floor personnel and they will be expected to possess new skills in the area of Industry 4.0, analytics, AI, robotics, etc. It is imperative to define the framework for up-skilling tnd re-skilling of existing staff, so that they are well placed to play enhanced job responsibilities in an effective manner. To accomplish this a holistic approach and framework need to be adopted to bridge the skillset gap and adopt new ways of working.

About the Author

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Kartik is responsible for the delivery of IoT transformation programs for our clients, leveraging solutions for IT-OT convergence, factory visibility, condition monitoring, predictive maintenance, digital twins for process & asset, and digital thread. His areas of expertise include product Design, Industrial Automation, and Industry 4.0. He has over 20 years of experience, taking up varied roles including Sales, Program, and Delivery Management, across geographies.