

INTEGRATION OF FACTORY ANALYTICS AT NOLTE MANUFACTURING

Tushar Mundodu (SUID 320432894)

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PROJECT CHARTER

PROJECT BACKGROUND:

Nolte Precision Manufacturing was founded by Lou Nolte over 100 years ago and is located at Cincinnati, Ohio. Nolte offers a holistic supply chain experience through superior service and value, to the clients, by providing customised precision assembled components.

Sight Machine, on the other hand, was founded in Ann Arbor, Michigan in 2011, provides the best integration of the Silicon Valley technology with Detroit manufacturing through big data analytics. The goal of the company is to make better and faster decisions about manufacturing operations by incorporating AI, ML and advanced analytics tools.

PROJECT DESCRIPTION:

Nolte Precision Manufacturing has always strived to be innovative to sustain a competitive edge in the market, and now aims to dominate the industry as a 'smart factory'. To do this, the key stakeholders in the company decided to utilise the incoming capital through the aerospace parts tender to invest in the future of manufacturing systems by collaborating with Sight Machines.

BUSINESS CASE:

- i. Ensures sustained competitive advantage by complementing precision manufacturing with advanced information analytics.
- ii. Multi-skilled employees who are trained with the latest IoT and analytical tools in the manufacturing industry.
- iii. Lower burden on the client and reduced client cost ownership leading to entrusting the companies with long term contracts and loyalty.
- iv. Efficient project planning and regular meetings ensures a comfortable customer-client-user relationship.
- v. Centralised project lifecycle management with the involvement of an Integrated Change Control Board.
- vi. Better inventory and data management in all divisions of Nolte Manufacturing, conforming to Nolte's age old values of continuous innovation and improvement.
- vii. Incorporation of 'Plant Digital Twin' technology in other types of CNC and assembly machines as well broadening the spectrum of profits from this integration, and a possible expansion of the smart factory in other locations too.

DELIVERABLES:

PRODUCT DELIVERABLES:

- i. Using the 34 computer based machining equipments like CNC Lathe Turning and Milling to convert to IoT technologies which is compatible with the Plant Digital Twin analytical software.
- ii. Modification of the existing database system in Nolte to allow three special types of reports:

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- a. Product Cost Analysis
 - b. Employment Efficiency Analysis
 - c. Each Product's Profit Analysis
- iii. Project Overview presentation for the executive group and the Board of Directors in Nolte.
- iv. Evaluation of the manufacturing process to recommend efficiency improvement points to the clients in terms of inventory, process and assembly management.

PROCESS DELIVERABLES:

- i. *Project Charter-Scope Document*: This document will provide a precise description of project origin, description, business case, list of deliverables, known project constraints, scope, project team, roles and responsibilities, list of high-level phases, project integration plan, initial risk and responses, and identification of key stake-holders.
- ii. *Work Breakdown Structure (WBS)*: WBS of the project will break all the work required for the project into discrete tasks, and groups the tasks into a logical hierarchy.
- iii. *Project Communication Plan*: This document will describe a set of strategies that address the methods for effective communication of different aspects of the project with the project team, cross-impacted areas of Nolte and the key stakeholders.
- iv. *Project Kick-Off Meeting and Schedules*: This document will contain specific details about planning, developing, managing, executing, and controlling the project schedule, after sign-offs by the key stakeholders.
- v. *Project Staff-Cost Estimate*: This document will indicate estimates of time and effort for various project-related task definitions, so that project can be completed in stipulated time. (*this is not done at the moment*)
- vi. *Quality Management Plan*: This document will provide details on the acceptable level of quality through automation and manual testing, to facilitate room for re-work.
- vii. *Project Status Reports*: These weekly documented reports will enable the management team to track the project progress and performance in a timely fashion.
- viii. *End-User System Training*: The end users at Nolte who are primarily shift supervisors and CNC machine operators will be trained on Sight Machine analytical tools well before the final project implementation.
- ix. *Project Closure, and Post-Implementation Review*: Formal closure once all deliverables are met. Official files created for archiving. Post Implementation Review will be conducted to determine the project's success.

“TRIPLE CONSTRAINT”:

1) TIME:

No specific time constraint per se. However, the project plan and budget must be produced to Greg Harrison (VP of Finance, Nolte Precision Manufacturing) by April 30th, 2018 to be presented to the Board on May 11th, 2018. Following the approval of this project plan, the first rollout will be executed on June 1st, 2018.

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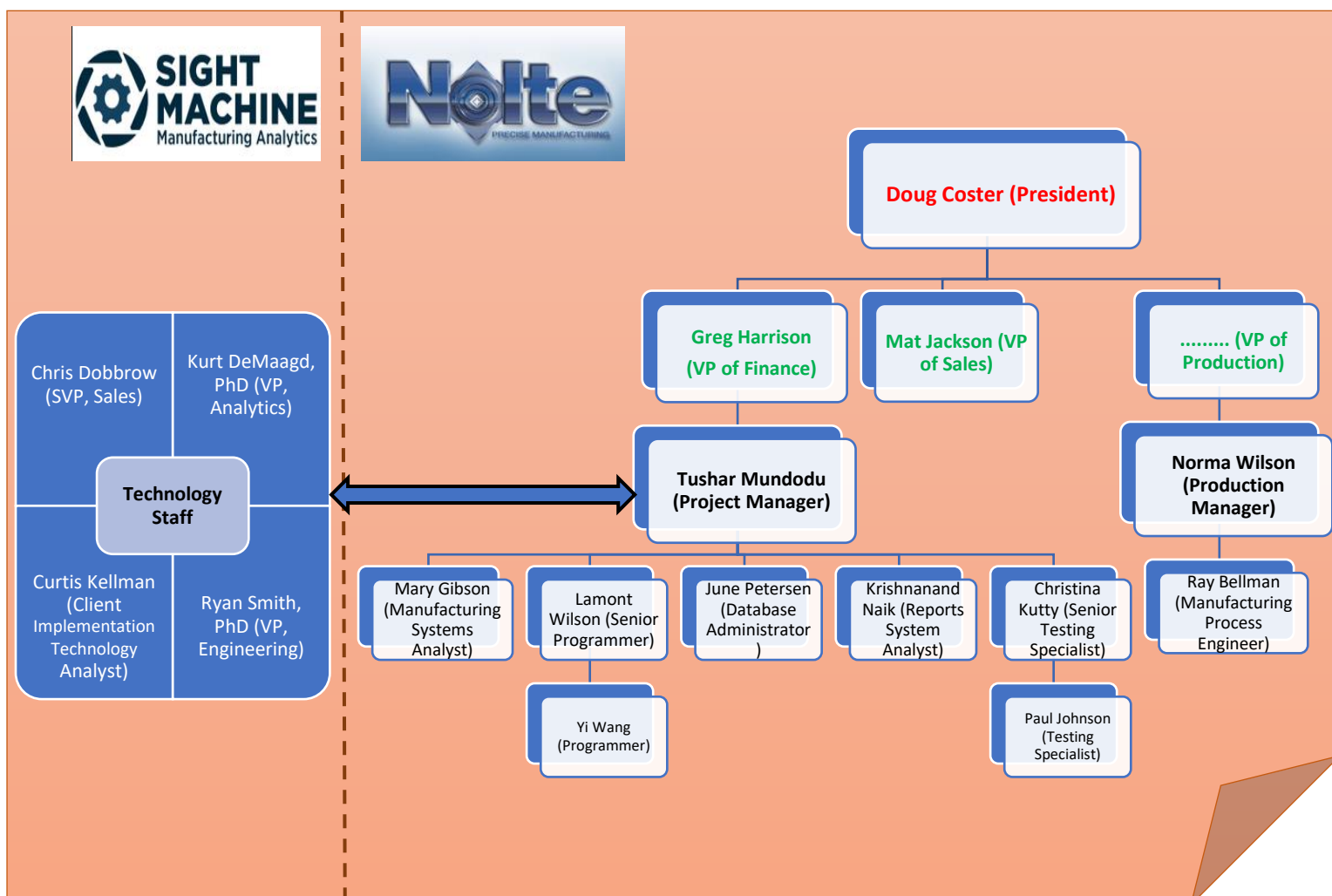
2) COST:

No cost constraints yet. The assumption is that the company has the capital to establish the first rollout and the entire cost to the company will be determined after all the project adjustments have been established.

3) OUT-OF-SCOPE AND ASSUMPTIONS:

- i. The primary purpose of this integration is to provide better insights into the data available for financial services.
- ii. Historical data available on the JobBoss servers will remain intact and will not be overwritten by any additional data. The additional data will be stored on the cloud with the help of analysts from Sight Machines.
- iii. The contract with Sight Machines has already been developed and is not part of the project schedule.
- iv. Project team will carry out the task efficiently and deliver on time.
- v. The assumption is that the analytical tools like 'Plant Digital Twin' used by Sight Machines will be compatible on the JobBoss servers of Nolte too.
- vi. No other organisation involved.

ORGANISATIONAL REPORTING STRUCTURE:



PROJECT CHARTER

Sponsors

Name	Designation
Greg Harrison	VP of Finance
Doug Coster	President

Other Key Stakeholders

Name	Designation
Norma Wilson	Production Manager
Mat Jackson	VP of Sales
...	VP of Production
Ray Bellman	Manufacturing Process Engineer

Project Team

Name	Designation
Tushar Mundodu	Project Manager
Mary Gibson	Manufacturing Systems Analyst
Lamont Wilson	Senior Programmer
Yi Wang	Programmer
June Petersen	Database Administrator
Krishnanand Naik	Reports System Analyst
Christina Kutty	Senior Testing Specialist
Paul Johnson	Testing Specialist

Sight Machine Technology Team

Name	Designation
Curtis Kellman	Client Implementation Technology Analyst
Ryan Smith, PhD	VP, Engineering
Kurt DeMaagd, PhD	VP, Analytics
Chris Dobbrow	SVP. Sales

PROJECT HIGH-LEVEL PHASES:

- i. The project process is first initialised through a work request form which provides project background, starts the project tracking process and analyses possible positive and negative risks that can be encountered by the project.
- ii. In PHASE 1, 34 computer based machines – CNC Lathe, CNC Milling, Swiss Machining are converted to IoT technologies compatible with the analytical software used by Sight Machines – Plant Digital Twin, which enables real-time visualisations and provides actionable insights for every line in the enterprise.
- iii. In PHASE 2, a portion of the result is extracted and linked to Nolte's existing JobBoss servers to provide financial analysis of the data in the form of 3 customised reports unique to Nolte – Product Cost Analysis, Employee Efficiency Analysis, Profit Analysis by Product.
- iv. In PHASE 3, prior to project implementation, the end users – shift supervisors and CNC machine operators should be well-trained on the analytical software incorporated by Nolte.

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PROJECT INTEGRATION PLAN – FORMS, MEETINGS, CHANGE CONTROL PROCEDURES:

- i. Different forms of integrations must be carried out by the Project Manager – software, system, project and process.
- ii. The integration plan adopted is that of a hybrid lifecycle management which is ideal in this scenario. The idea is to adopt adaptive methods through the various phases of the project implementation, with a pre-adopted predictive model after determining the triple constraints.
- iii. Project Manager will monitor, supervise and execute the project within the project team by tracking resources, progress and quality.
- iv. Regular meetings are scheduled on a daily or weekly basis between the various key stakeholders and the project manager to ensure there is effective communication and understanding of the deliverables.
- v. Deliverables must be met at each stage after prior approval. Checkpoints should be established as per the WBS in the project management strategy.
- vi. A change control board (ICCB) that includes key stakeholders with decision making power will be formed to review, approve or reject any changes required. Change requests will be raised through a change request form by the stakeholders and submitted to the change control board.
- vii. Cost Management is carried out to determine the budget for resources, equipments, installation and deployment of existing/new services on site.
- viii. Schedule Management is carried out to determine the time required for project completion based on various tasks to be carried out.
- ix. The Risk Management report must be regularly updated to be aware of potential positive/ negative risks associated with the project to ensure risk avoidance, transference or mitigation.
- x. Post the pre-final deployment of the project, the product backlog needs to be revisited to ensure all the checkpoints and deliverables are met.
- xi. Project Manager will ensure the timely closure of the project after stakeholder/sponsor acceptance and reflect on the lessons learnt during the project lifecycle.

CURRENT RISKS AND RESPONSES PLAN:

- i. Positive risks in the form of rollout of the project to all other machines at Nolte and exploiting all the resources offered by Sight Machines including cloud storage services.
- ii. If a beta test is not carried out on the compatibility of the software versions used by Sight Machines and Nolte Precision Manufacturing, the first rollout might fail leading to a loss of time and money due to the involvement of 34 machines in PHASE 1 of the rollout.
- iii. During data center upgrade, even if PHASE 1 runs without downtime or performance issues, the JobBoss servers used by Nolte could cause downtime issues.
- iv. In case of IoT softwares, there is always an added risk of cyber attacks which could lead to potential privacy intrusion, which at times could be detrimental to the client and customer.

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- v. The main business risk is investing time and money into this project and not realizing the projected benefits, if a Risk Priority Number (RPN) is not calculated.
- vi. As a part of responses to risk mitigation, Failure Mode Effects Analysis (FMEA) must be carried out conforming to PMI standards.
- vii. Risk Management Plan should be updated on a regular basis, even in case of small projects.

SIGN-OFF:

Name	Organisation	Designation	Signature & Date
Doug Coster	Nolte Precision Manufacturing	President	
Greg Harrison	Nolte Precision Manufacturing	Vice President of Finance	
Mat Jackson	Nolte Precision Manufacturing	Vice President of Sales	
.....	Nolte Precision Manufacturing	Vice President of Production	
Norma Wilson	Nolte Precision Manufacturing	Production Manager	
Tushar Mundodu	Nolte Precision Manufacturing	Project Manager	
Chris Dobbrow	Sight Machine	Senior Vice President of Sales	
Kurt De Maagd	Sight Machine	Vice President of Analytics	
Ryan Smith	Sight Machine	Vice President of Engineering	
Curtis Kellman	Sight Machine	Client Implementation Technology Analyst	