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Literature Review on ERP systems in Supply Chain & Logistics Processes

BY

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Abstract

The purpose of this report is to explore the use and impact of the SAP ERP system at TATA steel. The report will first look at the benefits of the ERP system in supply chain and logistics processes such as improved flow and enhanced collaboration. Tata steel utilises SAP ERP to integrate the core business process from purchasing all the way to invoicing to customers. Tata steel currently uses a hybrid model combining cloud-based solutions with real time premise solutions.

The report will detail the key SAP ERP modules utilised by TATA steel, from Materials management right the way to Plant maintenance. These modules of SAP support key business processes throughout the supply chain network and is a key program in everyday tasks and activities for TATA employees.

The report will look at the integration of other systems and explore the benefits and complexities in doing so and recommendations for further improvement.

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1.0 Introduction

The current competitive market and ever evolving factors within the steel industry, the effective management of supply chain and logistics processes is a vital component in maintaining operations stability and efficiency along with meeting ever changing business goals. Enterprise Resource Planning (ERP) systems are an important tool for business planning, information flow, execution and controlling. (Huntsville Et al, 2022). ERP systems have become a vital tool to streamline and integrate their core business practices. This report will focus on the utilisation of the SAP ERP system within TATA steel.

Founded in 1907 with the headquarters in Mumbai, India, TATA steel is one of the world's largest steel manufacturers with factories in over 26 countries. It is known for pioneering the steel industry and its commitment to quality and sustainability are at the forefront of their ethos. This report will look at the application of SAP ERP throughout the supply chain network in TATA steel and discuss the benefits and disadvantages faced.

2.0 ERP systems used in TATA Steel

The vendor of ERP system TATA Steel utilises is SAP ERP. SAP is one of the leading ERP vendors globally. (Huntsville, et al 2022) Tata Steel employs a hybrid deployment model that combines cloud-based solutions along real time workings. This hybrid approach allows to look at the scalability of solutions while also maintaining a secure control of on-premises systems. (Dupanov, 2022)

2.1 Current modules used from SAP ERP

- Materials Management: This is from anything to material master data, purchase orders and stock control. This module is designed to support procurement and inventory management processes within the supply chain network at TATA.
- Sales and Distribution: This is from anything to shipping invoices and tracking sales. The module is designed to support order processing, shipping, billing, and sale activity.
- Production Planning: Feeds information back to manufacturing to allow for scheduling and manning of lines. Designed to support planning and control of manufacturing processes.
- Financial accounting: Designed to handle general ledger, accounts payable and financial reporting.
- Controlling: Designed to manage costs, internal orders, and profitability analysis.
- Human Capital Management: Designed to support employee administration, payroll, and recruitment.
- Extended Warehouse Management: Designed to enhance inventory visibility and warehouse efficiency.
- Quality Management: Ensures that products meet regulatory and customer standards.
- Plant Maintenance: Manages maintenance activities, helping to coordinate all moving parts. (Valverde, et al 2012)

2.2 Current integrations used and benefits.

The SAP ERP system used by TATA Steel integrates with several other systems to enhance the current modules used:

- Customer Relationship Management: By integrating with the SAP CRM module, it allows TATA steel to manage customer interactions, record any specific details and improve sales processes. Overall using this integrated module allows for a full circle customer management from sales to deployment and monitors interactions that can highlight concerns or things done well for future proposals/interactions.
- Manufacturing Resource Planning: Integrating the MRP function with the current SAP modules allows for optimal planning and scheduling of manufacturing sights. It provides up to date stock inventory and looks at the current live orders in each DSO system and automatically allocates the material to the orders allowing for a streamline planning process for schedulers on the desk.
- E-commerce Platforms: By integrating with a variety of e-commerce platforms it enables TATA Steel to handle online sales, order processing alongside manual on site ordering.
- Warehouse Management System: this integration improves logistic planning, execution, and freight management. This integration is currently undergoing mass improvements with current supply changes in TATA Steel UK.
- Product Lifecycle Management: Integration with the PLM system allows managing the entire lifecycle of products from inception to service and disposal. It incorporates the design and manufacturing processes allowing for a streamline innovation of products.

3.0 Challenges of integration

Despite having numerous benefits utilising the SAP ERP system and integrated modules there are still several challenges that TATA steel face with implementation of such systems. These different factors can significantly reduce the benefits of efficiency, effectiveness and user satisfaction using the SAP ERP system.

1.0 Complexity and ease of use

The extensive modules used by TATA steel are both a strength and weakness. By integrating so many systems and modules into the SAP ERP system it can become overwhelming for those using them. It also causes a high customisable aspect to the system to fit not only TATA steel as a whole but the individual processes for each site that may not be able to be unified. For example, the current 4 DSOs in the UK supply chain network of TATA Steel use different programmes, this can cause issues when implementing process changes from the top and causes intricate IT development and detailed understanding of the individual processes. This can be time consuming and costly for the business as a whole in initial set up and when trying to implement any significant changes. Navigating the many modules and the intricacies involved requires significant expertise of the SAP programme and can create significant hurdles and time delays during the implementation process.

The complexity and customisable features of SAP also create a high demand for high level training and the learning curve from current legacy systems is significant. Resistance to change is always a significant factor when looking at business processes and improvement. With the SAP system having so many intricacies it may cause a barrier in rolling out new processes quickly in a fast-changing current climate.

2. System Issues

TATA Steel relies on a multitude of third-party systems integrating these with the SAP ERP system can be extremely challenging. With different data formats and legacy systems incorporating these into a one size fits all module can be challenging and cause issues in data consistency and lead to operational disruptions.

By using so many systems, a custom integration solution is often needed to bridge the differences between the architectural design of current systems used. Developing these solutions can be costly, time consuming and often require continuous monitoring to ensure they function correctly. For example, any changes in the legacy systems, will also require an update in the corresponding module of the relative ERP system. This adds a significant burden of maintaining all the systems.

3. Cost

The implementation cost of SAP alone is significant with software licence fees, hardware infrastructure and consulting services in initial configuration of customisation. This will involve significant resources and project management if any changes are required to the current processes.

There are also the ongoing costs of maintaining the system, updates, and support. Any tailor-made changes required for future business changes will also add to the financial burden that utilising an integrated ERP system entail.

4. Resource Allocation

The SAP ERP system used in TATA will need to be allocated the sufficient financial and human resources for the effective management of the program. It will require a dedicated IT team to oversee the administration, troubleshooting and continuous improvement practices along with hardware updates required.

5. Data Security

TATA Steel hybrid deployment model incurs further risks in the complexities of data security. Each environment whether it be on site or cloud will have its own security measures and vulnerabilities that make it challenging to maintain a consistent security position across the entire ERP system.

The ERP system in TATA handles a vast amount of sensitive data from employee records to strategic business information. Protecting this data is paramount and needs to be factored into any changes required throughout the implementation process. Implementing robust security measures such as audits, encryption and access controls will be a further strain to resources.

As the ERP system also handles such DATA it is critical that regulatory requirements with data protection and GDPR are factored in and with changes with regulations comes a continuous challenge to TATA. (Graeya, et al, 2022)

4.0 Suggested ERP integrations and benefits

To enhance the supply chain network within TATA Steel the following integration of modules and systems could be considered.

- Advanced Analytics and Business Intelligence: by incorporating advanced analytics and BI tools it can provide deeper insights into performance and predictive analysis can lead to better decision making.
- Internet of things Integration: IOT offers real time monitoring of manufacturing processes, leading to improved operational efficiency.
- Blockchain Technology: can improve supply chain transparency and enhance traceability and help to ensure authenticity of transactions.
- Artificial Intelligence and Machine Learning: this can lead to automation of routine tasks and help optimise demand planning and forecasting. This can then lead to improve inventory management using advanced algorithms and help with the drive to save ethos currently implementing throughout the UK network in TATA.
- Enhanced Collaboration platforms: integrating collaboration tools can help facilitate better communication and coordination among the Supply Chain networks.
(Huntsville, et al, 2022)

5.0 Conclusion

Whilst the implementation of SAP ERP system at TATA Steel has transformed the Supply Chain network processes by providing robust platforms that integrates various business functions allowing for improved efficiency and help facilitate enhanced decision making, like any ERP system it does not come without its challenges.

Addressing the complexity issues integrating the many third-party systems and modules can have the opposite effect on efficiency. To fully reap the benefits of the ERP systems the challenges raised in this report must be factored in and addressed to allow for a fully leveraged system. By adopting further technologies such as advanced analytics and enhanced collaborative tools, TATA Steel can look at further enhancing its competitive edge and improve the efficiency of its operations. Robust projection work on integrating the systems could lead to an enhanced strategic management of business processes within the Supply Chain Network and enhance the future growth and success of TATA Steel.

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