E-Manufacturing System in MIS (Management Information System)

Sandip Maurya

ABV-Indian Institute of Information Technology & Management, Gwalior, Madhya Pradesh, India

Abstract: *E-Manufacturing is a transformation system that enables the manufacturing operations to achieve predictive near-zero-downtime performance as well as to synchronize with the business system through the use of web-enabled and tether-free (i.e., wireless,web, etc.) technologies. It integrated information and decision-making among data flow (of business system level). E-manufacturing is a business strategy as well as a core competency for companies to compete in today's e-business environment. It is aimed to compete integration of all the elements of a business including suppliers, customer service network, manufacturing enterprise, and plant floor assets with connectivity and intelligence brought by the web-enabled and tether-free technologies and intelligent computing to meet the demands of e-business/e-commerce practices that gained great acceptance and momentum over the last decade.*

Keywords: e-Manufacturing, IMS web enabled platform, e-business system, e-design

1. Introduction

Today's competition in manufacturing industry depends not just on lean manufacturing but also on the ability to provide customers with total solutions and life-cycle costs for sustainable value. Manufacturers are now under tremendous pressure to improve their responsiveness and efficiency in terms of product development, operations, and resource utilization with a transparent visibility of production and quality control.

2. Features of e-Manufacturing

Internet-based e-manufacturing covers the range of online manufacturing activities for products and services, including product design, production control and conditions monitoring, supply chain management and maintenance. For any fully fledged e-Manufacturing solution including;

- Electronic technical and commercial systems.
- Systems and applications for sharing information.
- Protected and security systems.
- Infrastructure for sharing information
- Customer and supplier communications.
- Information to agreed standards.
- Managed, shared information and knowledge.
- Electronic 'through life' information.
- Information to support management decisions.
- Clear total process model and strategy.
- Documented process supported by procedures.
- Electronically supported processes.
- Secure processes.
- Concurrent engineering.
- An e-business vision.
- Supportive organization.

3. Preferment of e-Manufacturing

E-Manufacturing system is to enable real-time decision making among product designers, process capabilities, and supplier .It provides tools to access life-cycle information of a product or equipment for continuous design improvement.

Traditionally, product design or changes take weeks or months to be validated with suppliers. With the e-Manufacturing system platform, designers can validate product attributes within hours using the actual process characteristics and machine capabilities. It also provides efficient configurable information exchanges and synchronization with various e-business systems.

E-Manufacturing is a fundamental change in the strategic value proposition for manufacturers. Its collection of systems, processes, and technologies that support and enable manufacturers to compete in collaboration with others has;

- Synchronize Production Processes with Business Processes.
- Orchestrate Upstream Flows of Work, Information, and Material.
- Automate Business Processes & Workflows within the Enterprise.
- Give Control to Managers with Plant Information & Analysis Tools.
- Integrate the Design Process among All Collaborating Parties.

4. Looking Athwart Impenitent

E-Manufacturing is not an event; it is the result of an evolving process that manufacturing business will continue to refine as technology capabilities expand and business conditions change. Many companies are currently developing comprehensive-manufacturing suites, platforms and systems, especially for enterprise application integration purposes. For instance, Sun Microsystems has developed Sun Connect, an open standard framework, which enables all kinds of manufacturing organizations to integrate the power of their legacy systems and make their data, application and networking resources available across their entire enterprise. Many manufacturing SMEs (small and medium sized enterprises) are using computer based tools combining Web-based program for supporting their manufacturing and business operations .e-Manufacturing is an essential and inevitable technology for the future manufacturing organizations, working along the extended supply chains in particular.

There are several key elements which should be part of the application approach for any fully fledged e-manufacturing solution including;

- Electronic technical and commercial systems.
- Systems and applications for sharing information.
- Protected and security systems.
- Infrastructure for sharing information.
- Customer and supplier communications.
- Information to agreed standards.
- Electronic _through life_ information.
- Information to support management decisions.

5. Expected Results

E-Manufacturing includes the ability to monitor the plant floor assets, predict the variation of product quality and performance loss of any equipment for dynamic rescheduling of production and maintenance operations, and synchronize with related business services to achieve a seamless integration between manufacturing and higher level enterprise systems. In addition, it enables customer orders autonomously across the supply chain, bringing unprecedented levels of speed, flexibility, and visibility to the production process reducing inventory, excess capacity, and uncertainties.

6. Conclusion

E-Manufacturing is about more than Internet-based technologies. As well as expected impact to achieve high-velocity and high-impact manufacturing performance. Web-enabled technologies play indispensable roles in supporting and enabling the complex practices of design and manufacturing by providing the mechanisms to facilitate and manage the integrated system discipline with the higher system levels such as SCM and ERP. It involves every aspects of how a manufacturing organization does business including Design of manufacturing and business strategy;

- Sales and marketing.
- e-Procurement.
- Shop-floor operations.
- Enterprise application integration.
- Supply chain collaboration.
- Transactional e-business – providing real-time visibility.
- Collaborative engineering.
- Reliable, scalable, and common informatics platform between devices andbusiness, including implementation of wireless, Internet, and Ethernet networks in the manufacturing environment to achieve flexible and low-cost installations and commissioning.

Management Information System is a major pillar that supports the success of the integration of e-Manufacturing and e-business.

References

[1] Albus, J.S., A new approach to manipulator control: the CMAC, Journal of Dynamic Systems and Control, Transactions of ASME, Series, G., 97, 220,1975.
[2] Rockwell Automation e-Manufacturing Industry Road Map,http://www.rockwellautomation.com.
[3] Lee, J., Ahad Ali, and M. Koç, e-Manufacturing — Its Elements and Impact, Proceedings of the Annual Institute of Industrial Engineering (IIE) Conference, Advances in Production Session, Dallas, TX, U.S.A.,May 21–23, 2001.
[4] Koç, M. and J. Lee, e-Manufacturing and e-Maintenance — Applications and Benefits.
[5] Patrick Waurzyniak, 2001, "Web tools catch on", SME Manufacturing Magazine, v. 127, n.4, Oct. 2001.
[6] Jack Welch and GE, Business Week, Oct. issue 1996.
[7] Telematics to the Rescue, pp93, IEEE Spectrum, Jan. 2001.
[8] Kenneth Schroeder Interviews with Investor's Business Daily, CEO of KLA-Tencor Corp., August 2000.
[9] J. Lee, 1996, "Measurement of machine performance degradation using a neural network model".
[10] J. Lee and B. Wang, 1999, Computer-aided Maintenance: Methodologies and Practices, Kluwer Academic Publishing.
[11] J. Lee, 1999, "Machine Performance Assessment Methodology and Advanced Service Technologies, Report of Fourth Annual Symposium on Frontiers of Engineering, National Academy Press, pp.75-83,Washington, DC.

Author Profile

Sandip Maurya graduated in Mechanical Engineering from Department of Mechanical Engineering, Annamalai University, Tamil Nadu, India in the year 2016. He is currently pursuing Masters in Management (Technology & Operation) at ABV-Indian Institute of Information Technology and Management, Gwalior, Madhya Pradesh, India.