E-Manufacturing Concept: A Review Paper

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Abstract
E-Manufacturing refers to the use of internet and web based applications to control production. Now-a-days, there is a challenge before manufacturing companies to make product on the fly that will attract new customers while retaining old customers also. Today the customer wants to get quality product and service without delay. Enterprises are integrating the e-manufacturing concept within their manufacturing facilities to harness the profits. This paper tries to identify various models based on E-Manufacturing Concept.

Keywords: E-Manufacturing.

1. Introduction
In the last decade, Technology is found to be changing day by day [7, 9]. Now days, customers demand valuable products at reasonable price. Manufacturers are fast accepting the fact that in order to boost the sales and increase the profits they need to pay more attention to customer satisfaction. Advance Manufacturing Methods was thought as sufficient for customer driven market approach but yet success was only partial in today’s internet-driven economy i.e. respond to customer demand in real time. This can be achieved by integrating AMT with internet and web based applications to form integral part of E-Business [1]. Today, the customer do not want to take any risk, so before purchasing the product, he ask from the known persons about the product i.e. enquire about the product, so there is a need for manufacturing companies to adapt a strategy which can provide products at reasonable price without compromising with the quality. For this, E manufacturing could be a solution. It is the application of internet and web based application to control production. E-Manufacturing can integrate customers, products, suppliers with the help of Internet Technology. E-Manufacturing results in frictionless exchange of information all over the world.

Now days, almost all big companies like Tata, Ashok Leyland, Maruti, and JCB are using automation to some extent. These companies are using CNC’S, Robotics, Automatic material handling system and many other automation equipments. Figure 1(a) shows after collecting data by production persons, they make reports and further send it to the management. To get any information regarding production equipment or production, management people ask the production department executives every time the information is needed. Figure 1(b) shows that by using E-manufacturing technique, different equipments can be connected via intranet or internet to ERP (Enterprise Resource Planning) [2] and finally the information can be accessed from various departments.

Figure 1(a): Before implementing E-Manufacturing [2]
It is clear from the diagrams that information needed by various departments can be directly collected with the help of E-Manufacturing technique.

1.1 Definition by Koç [11]

“It is a system methodology that enables the manufacturing operations to successfully integrate with the functional objectives of an enterprise through the use of internet, tether-free (i.e. wireless, web, etc.) and predictive technologies.

Customer is a king is traditional misnomer in most businesses. Today we are using information technology everywhere whether it is in banks, airports, corporate, educational institutions. Now a days, we are using it on the shop floor also

2. Tools of E-Manufacturing

2.1 Design

Today the customer demands changes very frequently. So there is a need to design a production system that can meet the changing demand pattern of customer. The system should be flexible enough so that new part designs can be introduced into system with relative ease [3,9]

2.2 Operate

High productivity is always desired. For this, equipments must work properly and products are of required quality at desired pace. For this, various techniques like six sigma, lean manufacturing, JIT, SPC are used [3,5].

2.3 Maintain

It is about maintain the resources efficiently to achieve continuous production. It is also called the managing things like materials, processes and employees in order to get continuous production at right quality [8,10].

2.4 Synchronize

It is important tool which can links various groups such as manufacturer and supplier. For example if CNC machine tool operating on shop floor need a replacement of tool then information is sent from first the manufacturer to the supplier and tool maker where tool can be assessed [4,6].

Figure 2 shows how the manufacturing technology changes with the 21st century. Today all most all manufacturing companies are using computers for designing process (CAD) and for manufacturing (CAM), its planning and quality control. Today companies adopt Just in Time concept to eliminate the inventory cost. Companies are making their full efforts to make the production system agile which can respond quickly as per the changing demand patterns.

E-Manufacturing concept has been practiced by more and more companies including small and medium sized enterprises’- Manufacturing includes online manufacturing activities for products and services, including product design and development, maintenance, supply chain management, sales and service through the internet. Most of the people are using internet for on line purchasing and selling of things. We cannot use E-Manufacturing
technology blindly. Success comes to those firms who adopt the best strategy as per the requirement and opportunities.

The developments in manufacturing technology have been very well depicted in figure 2.

Fig 2: Development in manufacturing technology as adapted from Cheng [3].

Supply Chain is very important concept in E-Manufacturing. E-Manufacturing is a Vertical (business) and Horizontal (Supply Chain) integration of system to ensure the correct dissemination of information throughout the value chain of a business, making use of appropriate technology like the internet to ensure that real time accurate information is available at all decision points throughout an organization and value chain. As enumerated by Greeff [13]

Fig 3: The transformation of e-Manufacturing for unmet needs in SCM as depicted in Koç [12].

Supply chain encompasses all activities associated with flow and transformation of materials from raw material stage to the end user. It involves involvement of four flows in a supply chain- Material, Information, Money and Ownership.

Integration of all tools and techniques like SCM, CRM etc. is basis for successful e-business. Similarly Collaborative planning, Real time information, Asset Management etc. are required for E-Manufacturing.

As discussed by Koç [12] synchronization of all integral tools, techniques and processes of e -Business, e manufacturing and e maintenance need to be addressed as shown in figure 4.
3. Conclusion

Various models of E-Manufacturing have been discussed in this paper. Usually, in most of the companies, method of manufacturing involves manual data information flow which takes a lot of time but the use of E-Manufacturing helps in frictionless exchange of information and system becomes capable to respond to changing demand patterns of customers. Mostly, when customer demand changes, it takes time to reach this information to the organization but use of E-Manufacturing involves exchange of information in real time thereby helping in quick response from the organization. This will also results in increase in productivity and helps in producing quality products. Case studies shows that Alex Engineering has installed better CNC machine and other tooling, to implement a job shop managing system with an emphasis on capacity planning and job costing. The installation cost is 20,000 £. Also, Good ridge installed a scalable, multi-language currency integrated ERP system handling everything from order entry to manufacturing, with five new assembly shops. The installation cost is 400,000 £[3].

References

[6] www.epsrc.ac.uk [accessed on 14/08/2012]