Editorial

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During the past decade, global manufacturing competition has increased significantly. This increased competition needs faster product introduction, team collocation and electronic data sharing. In such a dynamic marketplace, companies are under intense pressure to introduce new products to keep up with their competitors. Consequently, the manufacturing industry has been undergoing some fundamental changes, including a move to low-cost, high quality systems and a shift in focus from large business customers to diffused commodity market for all size and type of customers. The challenges include shortened product life cycle, high quality product, highly diversified and global markets with unexpected changes of technologies and customer needs. For such a dynamic market, the engineering design process plays an important role which includes a set of activities arranged in a specific order with the clearly identified inputs and outputs. The objective of this process is to satisfy customer requirements and management objectives. This process is considered efficient when output of the process satisfies general customer and defined requirements, meets management objectives and customer deadlines, and all these with less costs and resources. This process is based on forward engineering life cycle.

Reverse engineering (RE) is the process of disassembly, measurement, analysis and documentation of all features of components associated with an existing product. The results of the RE process could be a CAD model, strength or weaknesses of the current design, new design specifications and other design related issues. RE has been used widely in a variety of industries such as electronics, aerospace, medical and auto. There are many reasons for using RE in the manufacturing industries such as:

- original manufacturer of a product no longer produces the same product
- inadequate documentation of the original design
- bad features of a product need to be improved
- competitive benchmarking
- the original CAD model is not sufficient to support design, etc.

The aim of this special issue is to provide a comprehensive collection of the latest research and technical work in the area of RE. The title of this issue 'RE' is to support, promote and publish high quality research results, advances and technologies, developments, and the impact of RE on the engineering design including manufacturing for the 21st century's customer focused product.

The first article, authored by Ramnath, Elanchezhian, and Kesavan, presents an attempt to derive all the parameters necessary for designing the generator components such as crank case, crank case cover, crank shaft and cam shaft using RE from existing parts by performing analytic hierarchy process (AHP) a multi-criteria decision-making model by considering some important factor such as cost of processing, time of processing, flexibility of processing, and accuracy of processing. The data acquisition is done using laser scanner device which will give output in curve form. Then, exact model is created using Pro E software. In the new design, the bush bearing is replaced with ball bearing and the tail portion of engine is removed to reduce weight. Moreover, costlier hot chromium coating is replaced with cast iron liner and integral gear is modified and made separately in cam shaft. The manufacturing drawing is prepared using the collected data. The machining sequences for crank case, cover, crank shaft, and cam shaft are decided and a suitable process planning is proposed to the industry.

Simatupang and Sridharan explore, in the second article, the potential of drama theory in the analysis of interactive decision-making which often involves conflicts amongst multiple participants for process improvements in supply chain collaboration. Drama theory provides the analysis of strategic interaction to identify dilemmas, whereas a framework for collaboration is used as a tool to find initiatives for resolving dilemmas. An illustrative case study outlined in this paper is able to structurally expose and resolve different perceptions of the chain members.

In the third article, Ataee, Memarzade, and Alvani present a different aspects of collaborative networks which were studied and a conceptual model is proposed for inter-organisational collaboration. In their paper, the proposed model encompasses four major dimensions: facilitators, barriers, motivators and outcomes. Several factors are identified for each dimension. All of these factors in combination with each other can determine suitable collaboration type.

The fourth article by Jin and Yadav introduces an integrated reliability management programme for faster time-to-market electronics which are designed under the distributed manufacturing chain is to resolve the reliability issue across the product life cycle from design, manufacturing, integration, and field deployment. The system consists of four modules:

1 stochastic-based reliability prediction tools
2 real-time failure mode rate charts
3 corrective action effectiveness functions
4 reliability monitoring mechanism.

The proposed reliability management system is illustrated through the design and deployment of automatic test equipment. The study shows that reliability growth for complex electronics equipment can be approached from the entire life cycle.

Bendriss and Benabdelhafid present, in the fifth article, a new approach to response to increasing requirements of the markets increasingly fluctuating and an increasingly complicated demand, it becomes essential to rationalise and to regulate the physical displacement of the goods from the supply of raw material until the delivery of the end-product towards its final destination. In this sense, a goods traceability solution covering the whole of the stages of multimodal transportation chain can bring a better mastery of goods information and consequently contribute to the mastery of the global supply chain. In this paper, a modelling approach which has leads to the formalisation of a generic model of the goods traceability data is developed in order to facilitate the coherency setting and the interoperability between the different freight representations associated with each stage of its transport cycle.

In the sixth article, Strang introduces a grounded-theory case study method to a profitable multinational e-business company in the mobile communication service/product industry. The objective is to examine how new product development (NPD) subject matter specialists learned and acquired knowledge to produce innovative designs. A brain storming technique is used in a focus group (n = 17) to capture and contrast the NPD knowledge acquisition process with educational psychology theories applied in similar e-businesses studies. Three models are created to externalise the tacit NPD processes. The unique features in the NPD models are: a knowledge continuum (innate, tacit, and explicit); and a knowledge acquisition methodology that contained three similar phases when compared to a common educational psychology theory, but the phases are ordered differently and in the opposite direction.

The editors would like to thank the reviewers of this special issue. Without their assistance, this project would not have been possible. Finally, we would like to thank our contributors by allowing us to share the results of their research with the rest of the engineering community.