

ABSTRACT

During the past several years, the design field has been witnessing tremendous developments. Both software and hardware features of computers and Information Technology (IT) are exploited in 'product design' field. Particularly, several 'Computer Aided Design' (CAD) models have been under use by the product designers. However there is very little evidence that the practitioners have adopted these CAD models for enhancing agility in organizational arena. This situation reveals the need of a model to facilitate the use of CAD features for imparting agility in organisations. Agility refers to the capability of an organization to produce any type of product, process and service demanded by the customer in any volume, in a shorter span of time without compromising on quality and cost. In order to fulfil this need, during the conduct of research being reported in this thesis, a model called Total Agile Design System (TADS) has been developed for designing products quickly and thereby enabling the traditional companies to imbibe agility.

After designing TADS model to overcome the problem mentioned above, its six phases were subjected to implementation studies in an electronics switches manufacturing company by name Salzer Electronics Limited (hereafter referred to as Salzer). The management of Salzer agreed to depute their team consisting of six employees to participate in TADS

implementation studies. Subsequently, 12 modules of this research involving the six phases of TADS were carried out.

The implementation studies were begun by designing and examining the technique called Agile Innovative Total Quality Function Deployment. This technique was used as a data technology to convert customers' reactions into technically understandable innovative solutions. Subsequently, the feasibility of digitalization of all existing switches manufactured by Salzer was studied. Then the feasibility of CAD/CAM interfacing was studied. This was followed by conducting computer aided design of experiments. Then the manufacturing feasibility of CAD models was studied by using CAM software. Next, the prototypes of two of the components were developed using Rapid Prototyping Technology (RPT). Thereafter, the amalgamation of Mass Customisation (MC) and Agile Manufacturing (AM) was studied.

Since TADS results in different products consuming varied types and levels of costs, a new costing system called TADS- Activity Based Costing (TADS-ABC) was designed and developed. Subsequently, the agility index was calculated in the existing system and after the anticipated implementation of TADS. In order to provide computing and knowledge assistance to calculate and analyze the agility index, a Decision Support System named as Decision Support System for Quantifying Agile Criteria (DESSAC) was developed. Finally, the reactions of practitioners and experts on TADS were carefully gathered using questionnaire based interviews.

Those data thus collected were analyzed and interpreted to indicate the practical propensity of TADS.

Currently, the industry captains are striving to achieve world class status. The results of the surveys conducted during several stages of research have indicated that, the implementation of TADS shall facilitate the achievement of world class status in traditional environments. However, these results hinted that although TADS enjoys high practical propensity in achieving world class dimensions, it requires further enhancement to attain this goal. This observation leads to the inference that the roadmaps proposed during this research have to be followed to successfully implement TADS.