

suppliers and buyers [22]. In this paper, SD model is developed to evaluate the Suppliers' performance, giving consideration to quality.

3. Methodology

3.1 Overview of the Model

The model, Figure 1, consists of three main evaluation criteria which will be further modelled into three different independent subsystems. They are:

1. Processes Quality
2. System Quality
3. Gauge Calibration

The local weights found by AHP are used in subsystem models to establish relation between the various parameters [19].

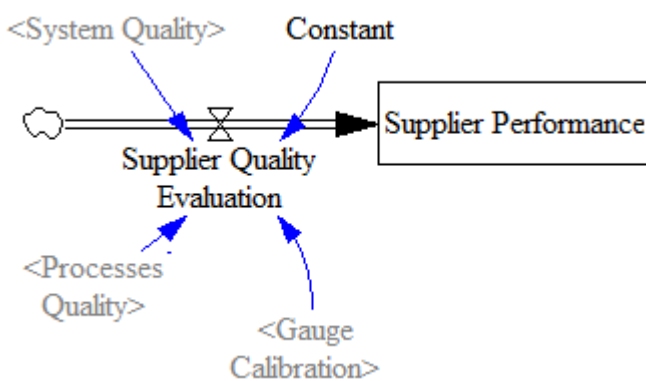


Figure 1: Overview of the Model

3.2 Model Subsystems

3.2.1 Processes Quality

This subsystem model, Figure 2, takes care of the various checkpoints at the Incoming, Process and Outgoing Inspection levels.

For example:

With Process Validation it is ensured that the product manufactured is within the acceptance range as decided with the buyer.

Processes which require physical inspection of the product requires display of limit samples in the work area for instance in case of molding, limit sample of the part should be displayed that will enable the person in charge to visually inspect and take the necessary actions required like noting and changing process parameters if discrepancies occur.

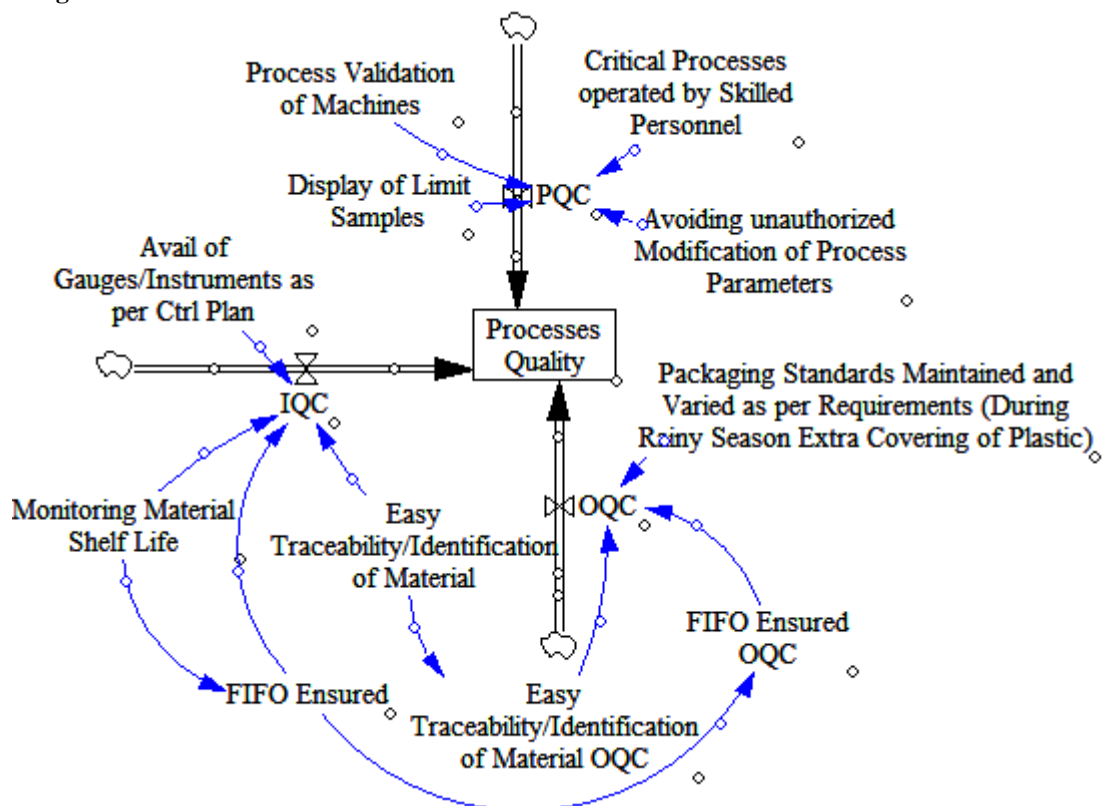


Figure 2: Processes Quality Subsystem Model

3.2.2 System Quality

This subsystem model, Figure 3, tries to pinpoint the system requirements at the suppliers' end so as to ensure the required standards of quality are maintained. Organizations trying to climb next levels of excellence need to have their

suppliers aligned with their direction [23]. Since ABC Company pursues continuous improvement programs like Six Sigma, Total Quality Management etc. it expects its suppliers to do the same.

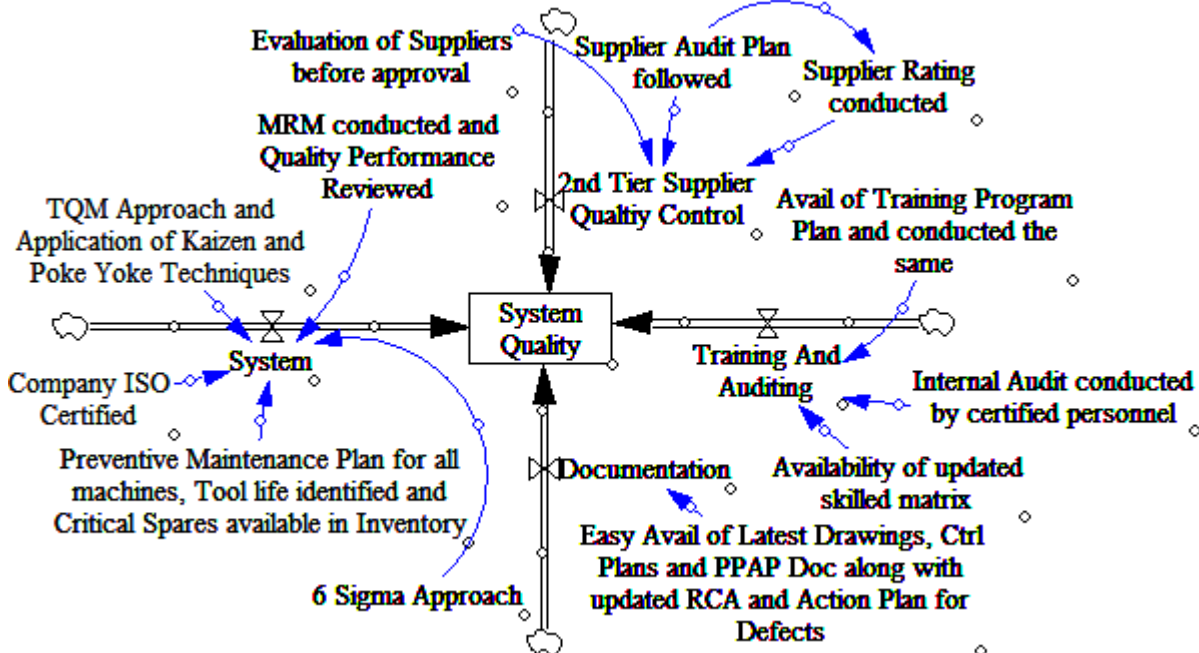


Figure 3: System Quality Subsystem Model

3.2.3 Calibration

It has been observed that good measurement quality minimizes the cost of production processes as accurate measurements can help to reduce process variation, scrap, rework and other costs of poor quality [23]. Hence this subsystem model is created to take care of these points.

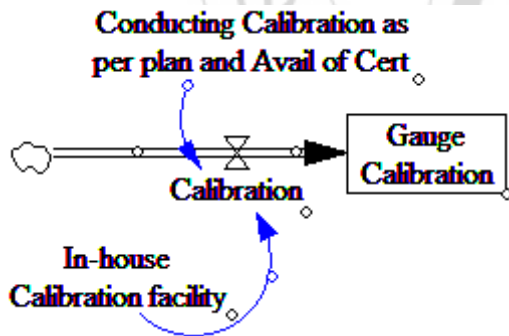


Figure 4: Gauge Calibration Subsystem Model

4. Results

After the model was developed site visits were conducted. Five Suppliers were chosen and their performance was compared. Out of these five suppliers, three (Suppliers 2, 3 and 4) had poor defects PPM (Parts per Million) and two (Supplier 1 and 5) had defects PPM within the acceptable limits. In PPM, rejections for the month are extrapolated to find the number of rejections if the production was 1 million. Their performances were compared for all the Subsystem Models. Following are the results that were obtained. The graphs suggest the likeable performance of suppliers for the period of next 2 years if the suppliers continue the way they are working towards improving quality.

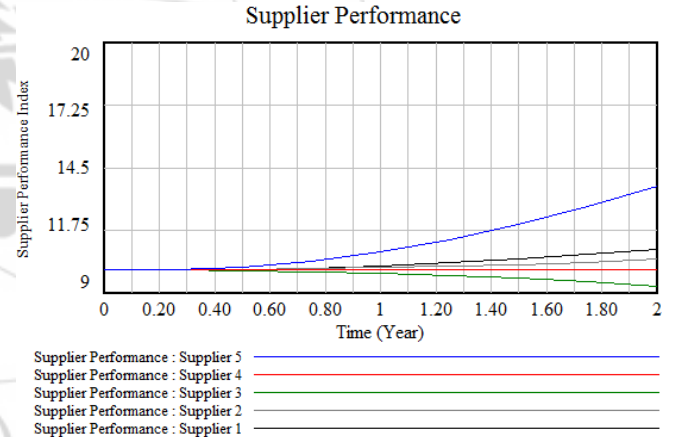


Figure 5: Supplier Performance of Five Suppliers

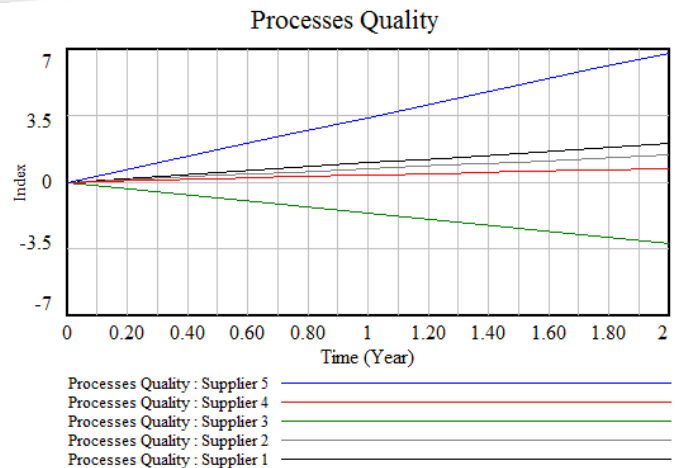


Figure 6: Processes Quality Performance of Five Suppliers

From fig 5, it was observed that Supplier 3 had the least performance among the five suppliers. The areas that it needs to improve are Processes quality and Gauge Calibration. Since Supplier 4 did not possess any data regarding its Gauge Calibration it was not evaluated for it. From Figures 7 and 8, Supplier 4 has to work on Systems Quality and Calibration of Gauges, and Supplier 2 on calibration of gauges. It was decided that with the suppliers their respective data would be shared and the action plan to improve on their weak areas would be charted out.

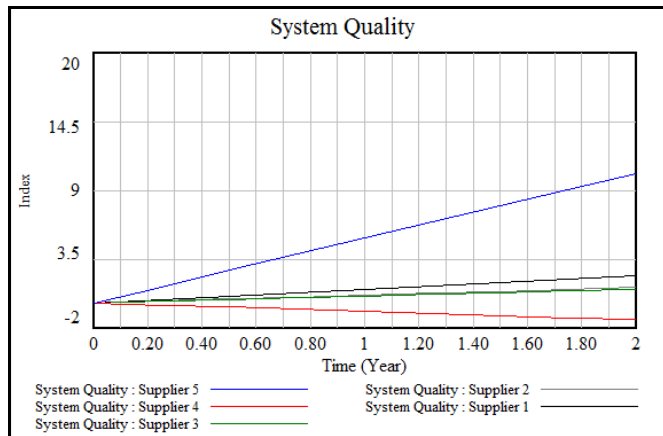


Figure 7: System Quality Performance of Five Suppliers

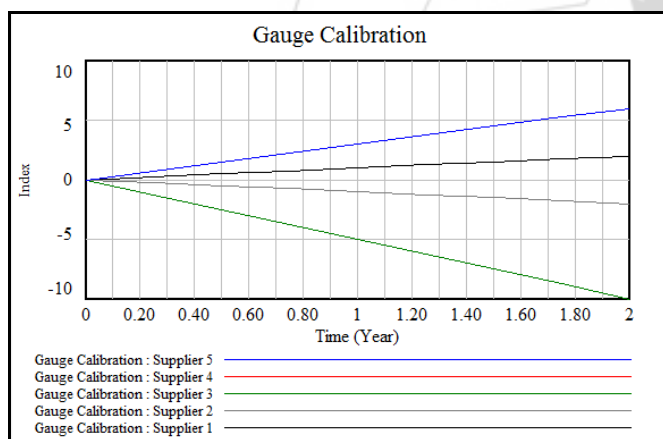


Figure 8: Gauge Calibration Performance of Five Suppliers

5. Conclusion

In this paper, a model, which adopts System Dynamics and has the basis in AHP, is constructed to evaluate the Suppliers' Performance – Quality Aspect for a Washing Machine Company in India. The model assisted in thorough thinking and decision making. The model enabled to assess and monitor suppliers' performance – quality aspect. Since the model requires site visits, the model is preferably to be applied for suppliers whose defects ppm was not within the acceptable limits. It could also be applied to suppliers who have requested for development assistance to the company. This would help the company to highlight strengths and weaknesses of the suppliers. For suppliers whose product quality is not up to the mark the company can pinpoint its weaknesses and ask to improve those areas particularly instead of just a vague "Improve Quality" phrase. The data of the "Best Performer" can be used to create competitiveness

among the Suppliers. Continuous reviewing standards will lead to continuously improving Supplier Performance. So at the end it can be concluded that "You can't manage what you don't measure. Hence measuring supplier performance will improve them". [8]

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