

Session 2C : Production & Operations Management & Other

Applying Neural Networks Methods on Improving the Performance of MCUSUM Control Chart

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The MCUSUM control chart is the one that performs better than Hotelling's T2 control charts when small and medium process shift is presented. However, the MCUSUM performs poorly when the process with larger shift is monitored (Woodall & Ncube, 1985). In addition, one cannot have any shift related information when the out-of-control phenomenon is detected by MCUSUM control charts. Thus, a lot of researchers employ neural networks' great learning capability to obtain the shift related information. This research will focus on how to use neural network to replace and improve the performance of the MCUSUM control charts. Three different neural networks: back propagation, support vector machine, and deep learning network are used to implement two different models respectively. The first model is to use the MCUSUM statistic as one of input data to detect out-of-control signal. And the second model is used to find the shift related information once the first model has detected the out-of-control signal. The results have shown that the more quality variables are monitored, the longer the ARL1 is expected if same shift is used. Both models have shown better performance on detecting out-of-control signal. However, model with deep learning possesses better robustness to different shift levels. And all models with three neural networks perform better than MCUSUM and Hotelling's T2 control charts.

Keywords: *Control chart, Neural networks, ARL*

Linking Sustainability aspects to sustainability strategies insights from a leading Sri Lankan Conglomerate

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Corporate Sustainability has gained a lot of attention in the business world as concerns over the environmental and social issues are on the rise. Adopting corporate sustainable practices not only benefit society at large but also benefits corporates in different ways. Further corporate sustainability practices can be identified in three pillars as economic, ecological and social. Sustainability strategies are the means of which the sustainable practices can be adopted successfully. Therefore, successful implementation of sustainability strategies is important. However, there is a dearth of studies conducted in studying how the sustainable practices are implemented through sustainability strategies, this study using the sustainability aspects and strategies developed by Baumgartner & Ebner, (2010), attempts to identify how sustainability practices have been adopted using the sustainability strategies. Following the case study method, an award winning leading conglomerate in Sri Lanka was selected for the study and its annual reports for five years were analyzed through a content analysis. Findings suggest that among the three aspects, least attended aspect is social sustainability while economic and ecological sustainability practices are satisfactorily adopted. Also the findings suggest that the company has used conservative sustainability strategy as the majority of sustainable practices adopted are mainly focused on profitability.

Keywords: *corporate sustainability, sustainability aspects, sustainability strategies*