

Predictive Technology in Remote Competitive Product Service Markets

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Abstract

In recent times, predictive technology is altering product design and performance by incorporating new capabilities such as monitoring, control, and optimization. By predicting specific failure modes, such technology converts unplanned, uncertain failure events into planned ones, reducing the effective product failure rate. It thus enhances the service productivity of the OEMs that also offer product maintenance services. Driven by these benefits, OEMs could use predictive technology to penetrate remote product service markets served by local fringe firms.

In this paper, competition for service of products between the original equipment manufacturer (OEM) and a fringe firm is studied using a sequential game-theory model. The OEM utilizes predictive technology to reduce the product failure rate, and the fringe firm provides efficient service at a reasonable price. Because of market remoteness, the OEM is incapable of matching the local fringe firm's service quality.

The price of service offered by the two players, the effective failure rate of the product when serviced by the OEM, and the fringe firm's service quality drive the number of products in the service market. Further, the captive market segment for OEM service and the products' failure rate as seen by each player drive that player's service demand. In such a setting, the OEM invests in predictive technology that reduces the effective failure rate of the products serviced by it.

We find predictive technology benefitting both the players at higher failure rates, thus acting as a Pareto improvement while implying co-existence in such remote product service markets. We further find the OEM dominating the fringe firm with higher price and profits only when the OEM captive market segment is large.

Biography

Amit Joshi is currently pursuing his Executive Doctoral studies at the Indian Institute of Management Indore. He also leads a large team of data scientists and data engineers at a US based multinational at their India headquarters and possesses an overall work experience of over twenty years working in gas turbine, wind turbine and power management domains. His research interests include mathematical modelling, data science and operations research