DEA-cross efficiency approach for peer assessment of retail stores’ efficiency

Nomita Pachar and P C Jha
Department of Operational Research
University of Delhi
Delhi, India
nomita.or.du@gmail.com, jhapc@yahoo.com

Anshu Gupta
University School of Management and Entrepreneurship (USME)
East Delhi Campus, Delhi Technological University (DTU),
Delhi, India
guptaanshu.or@gmail.com

Abstract
Retail industry is the most rapidly changing and dynamic industry in emerging economies like India. Indian retail industry is witnessing rapid growth due to vigorous investments, rise of multiformat retail, growing trends in e-commerce and m-commerce, and increasing penetration of internet. The growth in the sector is coupled with intense competition, shrinking revenues and rising expenditure on promotional activities, drawing attention of the decision makers towards efficient operations. It is imperative to develop methodologies for efficiency measurement to support planning and implementation of efficient operations. In this study we propose an approach for measuring the efficiency of multiple retail stores based on self and peer evaluation using Data Envelopment Analysis (DEA) methodology. The study also present comparison between self and peer evaluation scores and suggest roadmap for inefficient stores to identify the inputs and outputs to be optimized with respect to the nearest efficient benchmark. The validity and application of the proposed approach is presented through a case study.

Keywords: Retail stores, Cross efficiency, DEA, Benchmarking

Biographies

Nomita Pachar is currently pursuing doctoral degree at Department of Operational Research (OR) from University of Delhi, Delhi, India. She has qualified MSc and MPhil degrees in Operational Research from University of Delhi, Delhi, India in 2013 and 2015, respectively. She has obtained B.Sc. degree in Mathematical science in 2011 from Banasthali University, Rajasthan, India. Her area of research in doctoral degree is supply chain management with special focus on retailers. She is a CSIR Junior Research fellow (JRF). She has attended and presented in national and international conferences.

Anshu Gupta obtained her Ph.D., M.Phil and M.Sc. degrees in Operational Research (OR) from University of Delhi, India in 2009, 2005 and 2003 respectively. She is currently associated with University School of Management and Entrepreneurship (USME), East Delhi Campus, Delhi Technological University (DTU) as Associate Professor. Prior to joining DTU she has worked as Assistant Professor at SBPPSE, Ambedkar University Delhi, India (Feb 2012 – Sep 2018) and Department of OR, University of Delhi, Delhi (Aug 2009 – Jan 2012). She was research fellow at Department of OR, University of Delhi (2003 – 2008) and gold medalist in the master degree, 2003. She has published several papers in national and international journal of repute in the domain of mathematical modeling and optimization in marketing and software reliability, supply chain management and quality management. She has co-authored a book Software Reliability Assessment with OR Applications, published by Springer, 2011 and a chapter in Wiley Encyclopedia of Operations Research and Management Science. Her teaching interests include quantitative methods, decision sciences,
operations management, supply chain management and total quality management. She has attended and participated in organizing several national and international conferences.

**P. C. Jha** obtained his Ph.D., M.Phil. and M.A. degrees in Operational Research from University of Delhi, Delhi, India in 2004, 1988 and 1986, respectively. He is currently the Dean Faculty of Mathematical Sciences and Professor and Head, in the Department of Operational Research, University of Delhi, Delhi, India. He has published more than 45 research papers in the areas of software reliability, marketing and optimization in Indian & International journals and edited books. He has also co-authored a book *Software Reliability Assessment with OR Applications*, published by Springer, 2011. His research interests include modeling and optimization in software reliability, marketing and supply chain management. He has attended and participated in organizing several national and international conferences.