



**Dr. R.R.K Sharma**

Professor, HAG Scale (Since Aug. 2012)  
Department of Industrial and Management Engineering  
IIT Kanpur, India

Dr. Sharma has worked in industry for about 3 years and has spent 30 years doing teaching and research at the Department of Industrial and Management Engineering, IIT Kanpur, 208 016 India. He has taught over 22 different courses in management at IIT Kanpur India (to B.Tech., M.Tech. and M.B.A. students) and is well versed with all the facets of management and has unique ability to integrate different areas of the subject (management). To date he has written 1143 (peer reviewed (367) /under review (25) / working papers (751)) articles.

Dr. Sharma has won several national and international awards: American Medal of Honor and the 2006 and the 2008 Man of the Year award given by the by American Biographical Institute, Inc., 5126 Bur Oak Circle, PO Box 31226, North Carolina, 27622, USA. Web: [www.abiworldwide.com](http://www.abiworldwide.com). He is recipient of the Dr. Manubhai M Shah Memorial Award 2013 (instituted by the Indian Commerce Association) & it carried a cash prize of Rs. 1 Lakh, trophy and a certificate of excellence. In 2016: Prof. R.R.K. Sharma got the "Distinguished Educator Award", selected by IEOM (Industrial Engineering and Operations Management) Society, USA; given at Kuala Lumpur on MAR 09, 2016. Prof. R.R.K. Sharma received Faculty Research Award, given by career 360 degrees: For being among the 10 top most knowledge producers in India in 2017-18.

EDITOR: Prof. R.R.K Sharma

WORKING PAPER SERIES LECTURE NOTES IN  
MANAGEMENT SCIENCE

VOLUME 5

WORKING PAPER SERIES  
**LECTURE NOTES IN  
MANAGEMENT SCIENCE**

Collection of Research Articles

EDITOR  
Prof. R.R.K. Sharma



**VOLUME 5**



**EXCEL INDIA PUBLISHERS**

91 A, Ground Floor, Pratik Market, Munirka, New Delhi-110067  
Call: +91-11-2671 1755/ 2755/ 3755/ 5755 • Fax: 011-2671 6755  
Cell: +9899127755/ 9999609755/ 9910757755  
e-mail: [publishing@groupexcelindia.com](mailto:publishing@groupexcelindia.com) • Web: [www.groupexcelindia.com](http://www.groupexcelindia.com)

ISBN



Department of Industrial and Management Engg.  
**IIT Kanpur, India**