

# Research

Contributed by Administrator  
 Thursday, 13 September 2007  
 Last Updated Monday, 15 October 2007

Research Goals I aim to utilize my training and knowledge in Computer Science, Management Science and Information Technologies to solve demand generation and supply management problems that challenge companies today. In the process of solving these problems, I strive to understand the inner structures of these problems with analytical tools and computational support, so as to better unravel their beauties through mathematics and algorithms. In addition to publishing these results in reputable places, I aim to take a step further by developing the results into useful components, applications, and systems that will benefit industry and the society. Research Directions

- To research and develop methods and techniques which analyze and solve complex problems in the various areas in Engineering, Management and Science
- To research and develop methods and techniques which analyze and solve complex problems in the various areas in demand generation and supply management
- To develop these mathematical results into effective algorithms and programs and to apply these programs to solve real world problems in engineering, management and science
- To research and develop these advanced algorithms and programs into robust industrial-strength systems that handle dynamism, changes, and erroneous data
- To study and research how components, applications, and products can be effectively integrated into existing systems in a business process so as to facilitate effective information exchange and global optimization
- To study design patterns, software architecture, information exchange and integration so as to enhance our abilities to develop robust real world systems
- To deploy the research results, programs, and systems locally and regionally so as to enhance the competitiveness of the industry

## Illustrative Achievements

- Published more than 200 papers in refereed journals and conferences
- Obtained more than USD 4,000,000 of research funding and contracts
- Obtained best results on the following well-known problems:
  - o Vehicle Routing with Time Windows, Pickup and Delivery Problem with Time Windows, Container Packing Problems, Traveling Tournament Problems, Matrix Bandwidth Minimization Problem, Linear Ordering Problem, K-LCS problem, etc.
  - Li and Lim instances that is the de-facto standard for the Pickup and Delivery Problem with Time Windows (try googling using the keywords, &ldquo;Li and Lim PDPTW&rdquo;)
  - Further develop research results into cutting edge software packages and systems that are deployed in the industry (see Section on SOFTWARE SYSTEMS, PRODUCTS, and SERVICES)
  - Served as advisor or consultant to numerous multi-billion dollar international renowned companies such as Metro Group, Philips, HCL Tech (See Section on Consulting Engagements).
  - Co-Founded a technology company &ndash; Red Jasper Limited in Aug 2004

## Research Approach via two illustrations

**Freight Procurement and Optimization** We embarked on a journey in this area because we were able to utilize our skills in computing to build a web-based bid submission system for Philips Electronics in Asia Pacific in year 2004. Since then this project has evolved into a platform for Philips Electronic worldwide to procure all their strategic transportation contracts. At present, our platform handles all Philips procurement in FCL, LCL, Air Freight, Air Courier, and European Trucking. The total amount handled by the system is about 800 million USD annually. In the course of this project, we found out a number of interesting problems including the issue of minimum quantity commitment, freight guarantees for seasonally varying demand, and Free Trade Agreements. Using the techniques in operations research and algorithms, we analyzed the structures and complexities of these problems and proposed computational effective methods to solve them and to build them into software components and modules that are used in the procurement platform. This work has resulted in papers accepted or published in Operations Research, IIE Transactions, Transportation Science, Naval Research Logistics, Theoretical Computer Science, and European Journal of Operational Research, and Journal of the Operational Research Society, not to mention an Innovative Application of Artificial Intelligence Award in 2006 and numerous related works that we are currently working on.

**www.journal-ranking.com** The ISI Impact Factor (ISI-IF) is a simple broad-based method to rate the quality of journals. However, most researchers agree that the ISI-IF is not a good measure of journal quality for many research areas. We were intrigued by the lack of a more scientific measure and began our research by extracting citation information from various sources, analyzing the citation network and derived a new method based on techniques in operations research to rank journals. Our work provided a much better ranking than ISI-IF. Subsequently, we took a step further to build this method into a web-based platform and opened it to the public. Since its launch in January 2007, we received several million hits by visitors from over 100 countries, and from more than 1000 different universities, institutes, and companies all over the world. We have garnered so much interest that we have been/were invited to publish our work in top journals of various disciplines. Comments from many distinguished visitors have also provided us numerous insights in writing the

next set of papers on this subject matter. Finally, our work on [www.journal-ranking.com](http://www.journal-ranking.com) has culminated in an IAAI award in 2007. If you were to google "journal ranking", our website is listed as the first link.

Research Grants (2003 - )

- "RFID Training for Major Government Companies in Guangdong," Project Manager
- "To Quantify the Value of RFID/EPC Technology," GS1 HKG Limited, Deputy Project Manager, HKD600,000
- "Streamlining Cross-Border Clearance by RFID/EPC Technologies," GS1 HKG Limited, Deputy Project Manager, HKD750,000
- "Computational Logistics", Startup Research Equipment Fund, 2004, HKD\$500,000
- "Advanced distribution and transportation systems: Research and development into interoperability and collaborative commerce", UIM127, 12/2003-12/2004, Project Manager, HKD2,704,000
- "Information and decision technologies for logistics and supply chain management" - extension , HIA02/03.EG04, Yr 2004 Project Manager, HKD325,000
- "Information and decision technologies for logistics and supply chain management", HIA02/03.EG04, Yr 2003 Project Manager, HKD400,000
- "Computational Logistics", DAG02/03.EG07, Yr 2003, Project Manager, HKD100,000
- "Decision Support Tools for Intelligent Multi-modal Transportation Logistics", ITS/225/01, Yr 2002-2004, Deputy Project Manager, HKD6,207,000