

Research Interests

My primary research interests are problems related to management of supply chain within the broader area of operations and technology management. My current focus is on developing optimal approaches to design and operational management of production and service systems where quality, costs, lead time, flexibility and risks are some of the business factors considered.

Training in Industrial Engineering, Computer Science and Mathematics enables me to consider operations not only as individual entities but also as integrated systems that interact with each other. I am interested in exploring operational issues in any business enterprise that facilitates sound management planning and robust decision-making. This approach enables improvements in worker productivity, operational efficiency, customer service, and product or service quality. Integration among operations is of primary concern in such exploration. These efforts require studying and identifying a design alternative that combines these characteristics at an optimum level.

Research articles and books published are part of various research streams including supply chain management, healthcare systems applications, outsourcing, new product development, process innovation, technology management, logistics of transportation, inventory management, operations analysis, scheduling, quality management, and international operations. More recently, my research interests have shifted to learning more about operations and strategies that relate to *health care enterprises*, the *health sector* in general,

and various aspects of *global supply chain management* including critical factors such as costs, quality and technology.

The motivation to work on healthcare systems applications stems from my research interest in public policy issues, particularly healthcare systems and associated operations. I have read the Institute of Medicine report – “Crossing the Quality Chasm” – released in 2001. The major conclusion of this report was “Current Care System cannot do the job. Trying harder will not work. Changing systems of care will”. In it they enumerated the many systemic problems in the American personal health care delivery system. Among significant problems include: a highly fragmented system; rampant needless duplication; a system that lacks even rudimentary information systems; increasing long wait times; an overuse of services; some services are delivered where the risk of harm outweighs the benefits; and the system lacks “value” orientation. Many of these problems can be directly traced to lack of a systemic approach to operations.

I am interested in testing the efficacy of the body of knowledge available in Operations Management and Industrial Engineering fields to maximize the use of hospital and health system resources. The analytical approaches used by other industries that are drawn from these fields have matured and software support has become more sophisticated. It is my understanding that very little of these advances are utilized in U.S. hospitals today. Some useful tools and techniques can be identified for determining optimal process changes and for applying broadly across the healthcare supply chain.

Some of the research papers developed so far, that deal with healthcare systems applications relate to the following topics:

- Medical errors elimination in U.S. hospitals.
- Technical efficiency measurement of specialty hospitals versus community hospitals.
- Electronic health records economic justification and technical implementation.
- Smart hospital purchasing decisions to influence product packaging.
- Product recalls and counterfeit drugs control measures and mitigation in pharmaceutical supply chain.
- E-healthcare.
- RFID in healthcare supply chain.
- Medical diplomacy supply chain to curb extremism.
- Specialty hospitals emulating as focused factories – models for improved efficiency.
- HIPAA impact on U.S. healthcare systems.

The other major area of recent interest is global supply chain operation with a focus on outsourcing. Adoption of outsourcing strategies among companies in industrialized economies is perhaps one of the most visible, albeit contentious, features of the global economy. Properly managed, companies can reap the benefits of outsourcing and achieve the following two major objectives:

- To bring in the greatest value to the end customer.
- To ensure the highest level of productivity for the corporation itself.

The challenge for strategists and decision makers for any business operation is to make the best decisions possible. Outsourcing has become increasingly complex, with so many options to choose from. There are so many variables to deal with, so many risks to mitigate. Outsourcing is truly a multi-dimensional proposition with multi-dimensional impact. It has, not only, economic impact, but also societal, political, legal, psychological, environmental, and cultural impact. Outsourcing demonstrates certain paradoxes that are talking points in today's business discussions. Examples are "doing more with less", "cutting jobs to save the company", "cutting jobs to lower the cost of goods which benefit the economy and the consumer society", etc.

Some of the research papers developed so far in this arena relate to the following topics:

- Economic Growth of China and its impact on Domestic and International Supply Chains.
- Manufacturing Capacity Alignment through Closed Loop Insourcing and Outsourcing Decision Model.
- Challenges in new and global forms of sourcing arrangements.
- Decision Modeling Framework to Analyze Offshore Outsourcing Changes for U.S. Manufacturers.
- A Practitioner's Decision Model for the Total Cost of Outsourcing and Application to China, Mexico and the USA.
- Manufacturing Decision Framework for Minimizing Inventory Costs for a Configurable Off-shored Product Using Postponement.

- Outsourcing Strategies for Apparel Manufacture.
- Application of a Process Methodology and a Strategic Decision Model for Business Process Outsourcing.
- Decision Modeling Framework to Examine Whether the Offshore Outsourcing Landscape for U.S. Manufacturers is Migrating Away from China.
- Developing a Decision Framework for When and How Outsourcing should take place.
- Managing Supply Chain Risks in U.S.-China Trade Partnership.

This research has been published in journals including: *IIE Transactions*, *International Journal of Production Research*, *Journal of Operational Research Society*, *Journal of Revenue and Pricing Management*, *Interfaces*, *International Journal of Operations and Production Management*, *OMEGA*, *International Journal of Production Economics*, *Journal of Manufacturing Technology Management*, *Journal of Engineering Design*, *The Engineering Economist*, *Journal of Manufacturing Systems*, *Technovation*, *Information Knowledge Systems Management*, *Human Systems Management*, *Managerial Decision and Economics*, *Journal of Business Logistics*, *International Journal of Physical Distribution and Logistics Management*, *Transportation Journal*, *International Journal of Supply Chain Management*, *Supply Chain Forum*, *International Journal of Retail and Distribution Management*, *International Journal of Technology Management*, *Venture Capital – an International Journal of*

Entrepreneurial Finance, International Journal of Health Care Quality Assurance, Journal of Health Communication, and many others.