

Research Statement

My primary research interest is in developing optimal approaches to design and operational management of supply chains where quality, costs, lead time, flexibility, logistics 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 systems that interact with each other. I am interested in exploring operational issues in an extended 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, outsourcing, forward and reverse logistics of transportation, inventory management, new product development, process innovation, technology management, operations analysis, scheduling, quality management, healthcare systems applications, and international operations. More recently, my interests have shifted to learning more about various aspects of healthcare enterprises, the health sector in general and also operations and strategies that relate to global supply chain management including critical factors such as costs, quality, innovation 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 Systems 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. A few projects that I am currently working involve system dynamics modeling and quality management tools to examine: potential Avian flu pandemic disruptions on global supply chains and continuity strategies for mitigation; medical tourism; how should a modern day hospital design look like?; how RFID technology can improve efficiency and mitigate medical errors in hospitals?; how the role of nurses can be expanded for
long-term care during and post hospitalization?; and how can increased emphasis on preventive measures reduce national healthcare expenditures?

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

- Decision Support Tool To Streamline Patient Diagnosis For Chest Pain Utilizing Six Sigma DMAIC and Evidence Based Medicine.
- Supply Chain Disruption By Avian Flu Pandemic For U.S. Companies – A Case Study.
- Revenue and Cost Economics of Partnering with Health and Wellness Services.
- Service delivery of care in children who have had strokes: review of the initial diagnosis and ongoing treatments.
- 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 Hospital Cost Structure in the U.S.: What’s behind the Costs?
- Stage Implementation of RFID in Hospitals.
- An Ounce of Prevention: Revenue and Cost Economics of Partnering with Health and Wellness Services.
- Examining Quality and Efficiency of the U.S. Healthcare System.
- System Dynamics Modeling in Designing a Modern Day Hospital – a Case Study.
- Examining Potential Avian Flu Pandemic Disruptions on Global Business Operations and Strategies for Corporate Preparedness – A DMAIC Case Study.

Some of the research submitted for review in various healthcare journals include the following:

- Globalization of Health Care Delivery in the U.S. Through Medical Tourism.
- RFID in Healthcare: A Six Sigma DMAIC and Simulation Case Study.
- Six Sigma Tools in the Health Care Supply Chain: A U.S. Retail Pharmaceutical Service Application.
- Development of a hospital based menu driven clinician coding tool to implement quality reimbursement process.
- The Role of Leveraging Nurses for Long-Term Care During and Post Hospitalization.

The other area of interest is global supply chain operation with a recent 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.
- Outsourcing Strategies for Apparel Manufacture.
- Application of a Process Methodology and a Strategic Decision Model for Business Process Outsourcing.
- Decision 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.