WN801 EMPIRICAL RESEARCH METHODS IN OPERATIONS MANAGEMENT 4-0-0-4

Objective of course

In empirical research, the objective is to analyze real life data to understand, explain and predict how various phenomena of interest work.This data based analysis is often called the "scientific approach" to theory building and theory testing. Consistent with this perspective, the objective of this course is to introduce a range of empirical research methods to develop a set of skills for data based scientific inquiry into operational challengesfaced by both profit and non-profit organizations.

This course will help develop two primary skill sets:

- conducting independent research, critiquing articles and developing new research ideas,
- implementing a research study with the potential to submit in a journal.

Learning resources

The basic background text for the course is:
Joseph F. Hair, Bill Black, Barry Babin, Rolph E. Anderson, Ronald L. Tatham, Multivariate Data Analysis: Sixth Edition, Prentice-Hall, 2006.

Chapters of this book are referred as HABBAT in the outline below.In addition to the text book chapters, articles indicated in the course schedule will be progressively distributed over the semester.

Pedagogy

The student will be exposed to a few seminal articles that have been selected based on evidence of a novel approach to either domain knowledge and/or research methods. A significant component of the learningwould be review/critiqueof empirical papers in Operations Management.The focus of such critique isto primarily assess the logical correctness of the study. The processof critiquing wouldenablediscovery and learning of the key mechanisms of the empirical research methods.

Evaluation

Performance in the course will be evaluated as follows.

Article analysis and/or short presentations of the articles: (20%)
Every session will include discussion of multiple research articles that employ a specific research method. The discussion would involve brief summarizationof the main topic (which should be familiar to all participants), a review/critique of the appropriateness of the research methods,and the discussion of the findings and limitations. The student needs to bring his/her own perspective on the ideas expressed in the research paper. A good review/critique poses interesting questions, cites additional literature, extends the models and stimulates further inquiry and class discussion.

Final Exam: (30%)
There will be a cumulative final exam covering all assigned articles and in-class discussions. The test will aim to test the student's ability to understand the research problem and design an investigation approach to find answers to issues of interest. **Taking good notes of all readings and lecture can be very helpful in doing well in this exam!**

Term paper: (50%)
Participants will submit an individual term paper based on an empirical research. Toward this end, the instructormight be able to provide some datasets for developing a paper butit is expected of the students to become proactive in collecting appropriate data for analysis. Each student is encouraged to planearly about the paper and engage in data collectionbythe second quarter of the semester. Collecting and analyzing data on a topic of one's individual interest can be very useful in effective learning. The term paper should be a short empirical research note, consisting of a brief description of the research question, a small literature review highlighting why the question is of interest, the data, the methodology, the analysis, discussion of the findings, and conclusions. The paperneed not have the same level of rigor and comprehensiveness as that of apublished empirical research paper. However, there should be the potential to publish in a good academic journal.

The deadline for the term paper proposals will be in the week after the last session of the course; the deadline to complete the papers will be 8 weeks after that. If the term paper is not completed in 8 weeks then an incomplete grade will be assigned; the incomplete grade can be revised if the paper is submitted within 16 weeks of the last session of the course. Failure to submit the term paper within 16 weekswill result in a failing grade.

Course Schedule:
The following course schedule will be maintained. Instructor may modify the schedule as necessary to enhance learning effectiveness.

Session 1:Overview of empirical research methodology
Readings:
Chapter 1 in HABBAT

- Fisher, M. (2007). "Strengthening the Empirical Base of Operations Management", Manufacturing & Service Operations Management,vol.9(4), pp. 368–382.
- Flynn, Sakakibara, Schroeder, Bates, and Flynn (1990). "Empirical research methods in operations management**",** Journal of Operations Management, vol.9 (2), pp. 250–284
- Scudder and Hill. (1998) "A review and classification of empirical research in operations management", Journal of Operations Management, vol.16, pp. 91-101
- Verma and Goodale, (1995). "Statistical power in operations management research", Journal ofOperations Management,vol. 13, pp. 139-152

Session 2: Qualitative research
Readings:

- Yin, R.K. (2003). Case Study Research: Design and Methods, SAGE Publications. This is a classic, short introduction to case study research. Read Chapters 1, 2, 4 and 5.
- Eisenhardt, (1989). "Building Theories from Case Study Research", Academy of Management Review, 14(4), pp 532-550.
- Meredith, (1998). "Building Operations Management Theory through Case and Field Research", Journal of Operations Management vol. 16, pp. 441-454.
- Gibbert, M., Ruigrok, W. and Wicki, B. (2008). What passes as a rigorous case study? Strategic. Management Journal, vol. 29, pp. 1465–1474.

Session 3: Basic regression analysis
Readings:
Chapters 2 and 4, HABBAT.

- Gulati, R., Lawrence, P. R., Puranam, P. (2005) "Adaptation in vertical relationships: Beyond incentive conflict." Strategic Management Journal. Vol. 26, No.5, pp. 415-440.
- Lieberman and Demeester. (1999). "Inventory reduction and productivity growth: linkages in the
  Japanese automotive industry", Management Science, vol 45 no 4, pp. 466-485
- Lieberman, Helper and Demeester, (1990). "The empirical determinants of inventory levels in highvolumemanufacturing", Production and Operations Management, vol 8 no 1, pp. 44-55.
- Dean, Jr. and Snell, (1996). "The strategic use of integrated manufacturing: an empirical examination", Strategic Management Journal, vol 17, pp. 459-480.
- Assignments in Excel/SPSS; (using suitable data)

Session 4: Regression analysis (I): Discriminant Analysis and Cluster analysis
Readings:
Chapter 5 and 8, HABBAT

- Crask, M, Perreault, W (1977), "Validation of discriminant analysis in marketing research", Journal of Marketing Research, Vol. XIV pp.60-68.
- Dennis & Meredith, "An empirical analysis of process industry transformation systems", Management Science, Aug 2000 1085-109 (Cluster analysis)
- Bensaou, M, Venkatraman, N. (1995), "Configurations of inter-organizational relationships: a comparison between US and Japanese automakers", Management Science, Vol. 41 No.9, pp.1471-91.(Cluster Analysis)
- Miller, J.G., Roth, A.V. (1994), "A taxonomy of manufacturing strategies", Management Science, Vol. 40 No.3, pp.285-304. (Discriminant and Cluster Analysis)

Session 5: Regression analysis (II): Logistic Regression, Logit and Probit Analysis
Readings:
Chapter 5, HABBAT

- Gulati, R. (1995), "Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances", Academy of Management Journal, Vol. 38 No.1, pp.85-112.
- White, R.E., Pearson, J.N., Wilson, J.R. (1999), "JIT manufacturing: a survey of implementations in small and large US manufacturers", Management Science, Vol. 45 No.1, pp.1-15.
- Srinivasan, K., Kekre, S., Mukhopadhyay, T. (1994), "Impact of electronic data interchange on JIT shipments", Management Science, Vol. 40 No.10, pp.1291-304. (Logit analysis)
- King, A., Lenox, M. (2002), "Exploring the locus of profitable pollution reduction", Management Science, Vol. 48 No.2, pp.289-99. (Probit analysis)

Session 6: Factor analysis
Readings:
Chapters 3 HABBAT.

- Choi and Eboch(1998). "The TQM paradox: relations among TQM practices, plant performance,and customer satisfaction", Journal of Operations Management, 17, 1998, 59-75. (Factor analysis)

- Mukherjee, Lapré and Van Wassenhove, (1998). "Knowledge driven quality improvement",Management Science, vol 44 no 11, part 2 of 2, S35-S48.
  (Factor analysis, Regression)
- Samson and Terziovski, (1999). "The relationship between TQM practices and operational performance", Journal of Operations Management, 17, pp. 393-409
  (Factor analysis, Regression)

Session 7: Multivariate Analysis of Variance

Readings:

Chapter 6 in HABBAT.

- Reuer J.J.; Arino A. (2002) Contractual Renegotiations in Strategic Alliances, Journal of Management, Vol. 28, No. 1, pp. 51-74.(ANOVA)
- Ho, Tang and Bell, (1998). "Rational shopping behavior and the option value of variable pricing",
  Management Science, vol 44 no 2, part 2 of 2, December 1998, S145-160 (ANOVA)
- Klassen, R.D., McLaughlin, C.P. (1996), "The impact of environmental management on firm performance", Management Science, Vol. 42 No.8, pp.1199-1214. (ANCOVA, ANOVA, Regression)
- Assignments: ANOVA (Excel)

Session 8: Confirmatory Factor Analysis and Path Analysis

Chapters 10,11, and 12 of HABBAT.

- Malhotra and Grover, (1998). "An assessment of survey research in POM: from constructs totheory", Journal of Operations Management, vol 16, pp. 407-425.
- Benton, W. C., Maloni, M., (2005) "The Influence of power driven buyer/seller relationships on supply chain management. Journal of Operations Management, 23(1):1-22.
- Cousins, P.D. and Menguc, B. (2006). "The implications of socialization and integration in supply chain management, Vol. 24. pp 604-620.
- Grover, V. and Malhotra, M. K. (2003) "Transaction Cost Framework in Operations and Supply Chain Management Research: Theory and Measurement." Journal ofOperations Management, Vol. 21, No. 4, 457-473.

Session 9: Instrumental Variable Analysis

- Novak, S., Eppinger, S.D. (2001). "Sourcing by design: product complexity and the supply chain", Management Science, Vol. 47 No.1, pp.189-204.
- Angrist, J.D., Imbens, G.W., Rubin, D.B. (1996). "Identification of causal effects using instrumental variables", Journal of the American Statistical Association, Vol. 91 pp.444-55.

Session 10: Longitudinal Analysis: Panel data Analysis and Event History Analysis

- King, A., Lenox, M. (2001). "Lean and green? An empirical examination of the relationship betwee lean production and environmental performance," *Production and Operations Management*, vol. 10, no. 3, pp. 244-256. (Panel Analysis)
- King, A., Lenox, M. (2002), "Exploring the locus of profitable pollution reduction", *Management Science*, Vol. 48 No.2, pp.289-99. (Panel Analysis)

- Park, S.H., Russo, M.V. (1996), "When competition eclipses cooperation: an event history analysis of joint venture failure", Management Science, Vol.42, No. 6, pp. 875-890.(Event History Analysis)
- Hendricks, K.B., Singhal, V.R. (1997), "Does implementing an effective TQM program actually improve operating performance? Empirical evidence from firms that have won quality awards", *Management Science*, Vol. 43 No.9, pp.1258-74. (Event History Analysis)

(Note: Any of the above sessions can be substituted with one/two sessions on Secondary Data Analysis in it is felt appropriate!)