

ASU OPERATIONS MANAGEMENT REVIEW

Vol 1

**Department of Supply Chain Management
Arizona State University**

CONTENTS

Preface	5
Introduction	6
Framework	8
■ Business Environment and Operations	11
The Dark Side of Competition: Customers Become More Difficult to Satisfy	13
Combining Services and Products to Compete	17
Increasing Productivity: Hire Someone at Another Firm?	20
Is Competition Always Good?	23
Actors in the Innovation Play: What's Their Motivation?	26
■ Resource Build-Up and Allocation	31
To Locate, To Relocate, or To Reshore:	
No Matter How You Say It, Why Should It Be in a High Cost Country?	33
Acquire, Retain, and Provide Quality Service:	
Does a Firm Have to Choose How to Allocate between the Three?	36
Which Project to Prioritize or Delay?	40
Killing Two Birds with One Stone: Healthcare Cost and Quality	44
Non-Profit Organizations' Funding: Where to Use the Money?	47
■ Operations Scheduling and Timing	51
Mixing Different Fulfillment Channels: Just What the Customer Wants!	54
Timing Matters: The Effect of Time Gap between Service Events on Customer Responses..	57
Early and Late Six Sigma Adoptions	61
Does Working Faster Reduce or Increase Cost? Both Can Happen	65
■ Internal Process Management	69
The Origin of Operational Strategy Formulation and Integration between	
Top-down and Bottom-up Operations Strategies	72
Similar but Different Effects of "Lean" and "Green" on Firm Performance	75
Does Better Service Quality Bring Higher Profitability?	79

Autonomy and Technology Turbulence:	
The Blood Life or Death of New Product Development Teams	82
Stand Out by Standing First for Management Standard Implementation	86
Environmental Incidents and Performance – Reactions in China	89
■ Integration and Inter-organizational Interface	93
In-Store, Online, or Both? New Product Quality Decisions	96
Sharing Information with Farmers – How Will They Respond?.....	100
How to Translate Integration into Higher Productivity	104
1+1>2? The Impact of Social Media Integration	108
Government Stance – You're Interfering with Our Operations	111
■ Matching Demand and Supply	115
Inventory and Sales – Scarcity or Variety Effect?	118
When Disaster Strikes: Use Recourse Inventory Allocation?	121
The Best Structure for Replenishment Network:	
Suggestions for Micro-retailers in Developing Countries	124
Forecasting Similarly Unsimilar New Product Life Cycles	127
■ Interface with Consumers	131
Is Social Media a New Channel to Improve Operational Efficiency?	134
Offline Showrooms for Online Sales	137
Click Here to Buy and More!	140
If You Know Your Customers May Regret It, How Should You Handle and Leverage Their Regret?	143
Subscription or Per-Order:	
Profits and Environmental Impact of Online Grocery Shopping	147
Birds of a Feather...Want to Ride with Drivers of the Same Feather?	151
Decreasing Discrimination in the Sharing Economy	155
■ About Editors	159
■ Subject Index	162

Copyright © 2019 ASU OM Review (AOR) Board.

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law. For permission requests, contact aor@asu.edu.

ISBN: 9798619023787 (Paperback)

Any references to historical events, real people, or real places are used fictitiously. Names, characters, and places are products of the author's imagination. Any references to published papers and images are duly acknowledged. The content and opinions expressed in this project are purely the authors, and do not represent the official opinion or position of the department of supply chain management or Arizona State University.

Front cover image by vs148.

Book design by Catanna.

Printed by Amazon Direct Publishing Inc., in the United States of America.

First printing edition 2020.

AOR
C/O Department of Supply Chain Management
W. P. Carey School of Business
300 E Lemon Street
Tempe, AZ 85287

PREFACE

Understanding, creating, and communicating knowledge ... three pillars of scholarship. This publication, prepared by a small group of dedicated and developing scholars, provides a concise and lucid view of 36 contributions to the operations management literature. It reflects a slice of content covered in a doctoral seminar. It illustrates a creative approach to reinforce learning from the seminar and to disseminate knowledge. I believe it will serve as a valuable resource to both researchers and practitioners. Enjoy!

– Dr. Scott Webster

A pleasant guide to the evolving field of research in Operations Management. It is timely – it incorporates most advanced research from premier research outlets. It is actionable – it highlights real-world examples and practical implications. It is delightful - advanced mathematical models have been deciphered in a reader-friendly way. A must read!

– Dr. Mei Li

The ASU Operations Management Review is an excellent compilation and summary of research publications covering emerging topics in operations management. I commend the group of doctoral students that initiated this excellent resource. Biannual updating of the book means that it stays relevant and topical. I highly recommend this book as a “go to” and “must have” resource for doctoral students,

researchers and practitioners that require quick understanding of the status of research and future research opportunities in OM.

– Dr. Adegoke Oke

This is an excellent, interesting read. It helps the reader to quickly find and better understand relevant, cutting edge operations research articles. The author interviews at the end are invaluable, allowing authors the rare opportunity to elaborate on what they have published, and help the reader to better understand what they have written. A great idea, flawlessly executed, and an excellent read. Bravo to the ASU Operations Management Review team!

– Dr. Zachary S. Rogers

This volume would have not been drafted without contribution of the director and editors. We would also like to extend our sincere gratitude and appreciation for all the hard work and dedication provided by the voluntary reviewers. These volunteers are Feng Cheng, Kang Hsu, Stanley Lim, Adegoke Oke, Iman Parsa, and Lina Wang.

This project is partially funded by the Department of Supply Chain Management at W. P. Carey School of Business, and special thanks to Dr. Mohan Gopalakrishnan for his support.

INTRODUCTION

Since the genesis of operations management (OM), scholars have addressed managerial topics, emphasizing the relevance of their studies. Such effort has positioned operations management as an academic field renowned for its connection to practice. Given the research direction, the academic community has flourished in terms of the number of scholars, the volume of research outputs, and the diversity of research themes.

While we appreciate advances in OM by previous contributors, we face another challenge today. The continuous development in OM has led to a flood of new knowledge, which cannot be easily handled by a single research entity. In addition, the field has also deepened the depth of new knowledge, making it much more time-consuming to internalize the new knowledge than previously. Furthermore, real-world problems are becoming more complex and emerging more rapidly. These new challenges increase the friction between stakeholders in the field of operations management. Indeed, as we study OM and other relevant subjects, we consistently witness that stakeholders suffer from the burden of learning new knowledge. Despite the arduous learning process while floundering in the flood of cutting-edge knowledge from recent advances in academia, many graduate students often forget the details of the knowledge as they move onto the next stage of their academic careers. Likewise, although professors are the main entity of pioneering knowledge, many of them are repeatedly chased by their hectic schedules and

thus suffer from insufficient time to digest new knowledge. Meanwhile, practitioners frequently feel distant from academic advances because of the entry barrier intensified by far-reaching scientific advances. Looking back at how OM took place and how it contributes to the real world, one might question as to what the OM community should do to address this burden of new knowledge.

The vision of ASU OM Review (AOR) is to channel new knowledge learned by PhD students to stakeholders of OM. AOR helps its editors understand OM more comprehensively as they evaluate research, address relevant issues, and link new knowledge to real-world issues. Extensive and constructive reviews of AOR also assist peer researchers in navigating their research directions through the fresh eyes of AOR editors, especially in new research domains. Finally, reader-friendly and concise content of AOR eases the understanding of academic knowledge for practitioners, thus bridging the gap between practitioners and academic scholars.

To address and deliver the cutting-edge knowledge in OM, we selected and reviewed studies as follows:

1. Given the academic theme (e.g., service management), each editor (hereafter, “first editor”) independently searched, selected, and reviewed one academic paper published in one of the top OM journals between 2014 and 2018. The journals include *Decision Sciences*, *Journal*

of Business Logistics, Journals of Operations Management, Operations Research, Journal of Supply Chain Management, Management Science, Manufacturing and Service Operations Management, and Production and Operations Management. A few exceptional papers published other than these journals (e.g., *Strategic Management Journal*) were also included upon the prior permission of the director.

2. The initial reviews of the selected papers were presented and discussed by the editors in the PhD-level Operations Management seminar (SCM 791, Fall 2018).
3. At the end of the class, editors used the Delphi method to select papers eligible for more extensive reviews. The selection was based on the three-level rating schema; 0 = not recommendable; 1 = considerable; and 2 = strongly recommendable. After the initial vote, the director and editors discussed the voting results and criteria and voted again after the discussion. As a result, of the initial 72 papers in 12 topic areas, the top ranked 36 papers were selected.
4. In December 2018, the director evaluated the initial reviews by first editors and randomly assigned the reviews to the other editors (hereafter, “second editors”). Building upon the initial evaluation by the director, second editors individually re-framed the reviews to be more comprehensive and added related cases to the reviews.
5. Evaluation and iteration of reviews were conducted. First, the jointly constructed reviews by first and second editors were evaluated by the two lead editors (i.e., Seongkyoon Jeong and Seth Washispack; hereafter, “co-editors-in-chief”). Second, the director assessed the evaluated reviews, added more comments, and returned them to the editors. Finally, using the evaluation notes by director and co-editors-in-chief, the first editors revised the reviews, and the second editors updated the cases. This iteration cycle was performed three times until May 2019.
6. After the iteration, external members (e.g., other faculty members) performed friendly reviews in each expertise area. In June 2019, the final reviews were drafted upon this additional review.
7. From January 2019 to June 2019, the co-editors-in-chief contacted the first authors of the papers, and asked questions regarding idea generation process, challenge during research, and future research plans. Of 36 authors, we received 18 responses to our questionnaires. The Q&A with authors were added at the end of each corresponding review.

The content is divided into several sections. Each section starts with a brief review of the topic area and lists reviewed papers. Each review introduces background and a real-world case, discusses key insights and remaining questions, explores related domains, and points out classical approaches and studies.

We hope AOR contributes to not only disseminating the cutting-edge academic knowledge in OM within and outside the academic community but also developing the collaborative understanding of recent advances in OM.

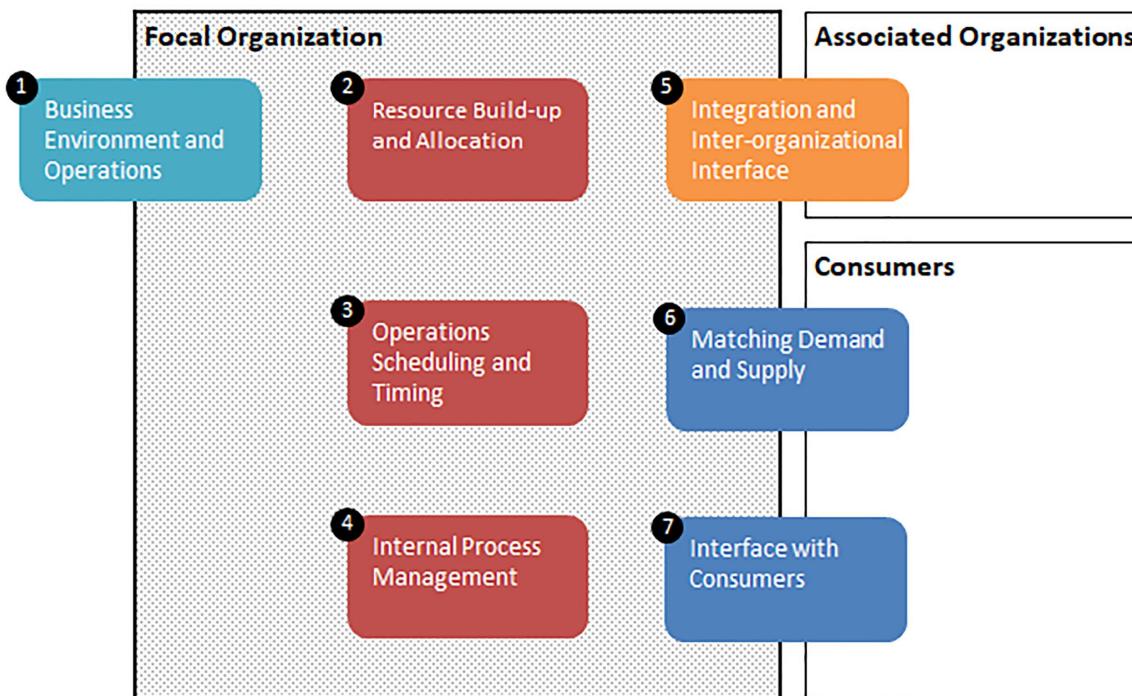
FRAMEWORK

To increase readers' holistic understanding of operations management, AOR introduces reviews of recent studies using the following framework, as shown in the illustration below. We first categorize the reviews by the organizational boundaries of operations. In Section 1, we focus on the interface between focal organization and business environment such as competition in the industry. The subsequent sections (Sections 2, 3, and 4) address the management of internal operations such as resource build-up and allocation, scheduling and timing, and process management. Next (Section

5), we turn our attention to the areas of integration and inter-organizational interface. Finally, the last two sections (Sections 6 and 7) highlight how firms approach consumers, especially regarding matching demand and supply and interfacing with consumers.

Each section begins with a brief introduction of the section and a list of the reviewed studies. On the introduction page, AOR provides tags for the listed studies that inform readers about academic areas, research methods, and associated sectors to help the reader navigate the reviews.

Business Environment



The reviews are constructed in the following structure.

Background explains why the research question is raised and why we need to pay attention to the research topic of the study.

Mini Case introduces practices and cases related to the research topic.

Key Insights summarizes the research approaches and the results of the study and suggests implications.

Remaining Questions discusses unaddressed but important questions associated with the study.

Want to Know More? expands our views on the research topic by introducing streams of relevant studies in other dimensions.

Foundational Classical Studies lists the classical studies that are used as foundations of the study.

References is the list of studies referred to by the reviews.

Behind-the-Scenes includes an interview with the authors of the study regarding the idea generation, research challenges, remaining research goals, and current ongoing studies.

BUSINESS ENVIRONMENT AND OPERATIONS

The performance of operations is not solely determined by the focal organization's practice. Business entities compete with other entities over customer gain, product sales, and even resource requirement. Thus, understanding the impact of business environment is an essential step in planning operations and setting operational goals. Classical studies typically focused on how business environment determines the price and service quality level, especially centering on competition. New emerging studies are exploring the impact of business environment in more diverse dimensions such as behavioral aspects (e.g., change in customers' sensitivity to quality and firm's inspiration due to relative performance) and strategic aspects (e.g., business network based human resource management and strategic investment and pricing). In this section, we review recent studies that highlight the new emerging perspectives bridging business environment and operations strategy.

Topics in This Section

The Dark Side of Competition: Customers Become More Difficult to Satisfy

Based on Buell, R. W., Campbell, D., & Frei, F. X. (2016). How do customers respond to increased service quality competition? *Manufacturing & Service Operations Management*, 18(4), 585-607.

Service Management Empirical Research Financial Sector

Combining Services and Products to Compete

Based on Guajardo, J. A., Cohen, M. A., & Netessine, S. (2015). Service competition and product quality in the US automobile industry. *Management Science*, 62(7), 1860-1877.

Service Management Empirical Research Manufacturing Sector

Increasing Productivity: Hire Someone at Another Firm?

Based on Wu, L., Jin, F., & Hitt, L. M. (2017). Are all spillovers created equal? A network perspective on information technology labor movements. *Management Science*, 64(7), 2973-3468

Innovation Management Empirical Research IT Sector

Is Competition Always Good?

Based on Wani, D., Malhotra, M., & Venkataraman, S. (2018). Impact of competition on process of care and resource investments. *Journal of Operations Management*, 57, 23-35.

Service Management Empirical Research Bio-medical Sector

Actors in the Innovation Play: What's Their Motivation?

Based on Eggers, J. P., & Kaul, A. (2018). Motivation and ability? A behavioral perspective on the pursuit of radical invention in multi-technology incumbents. *Academy of Management Journal*, 61(1), 67-93.

Innovation Management Empirical Research Bio-medical Sector

THE DARK SIDE OF COMPETITION: CUSTOMERS BECOME MORE DIFFICULT TO SATISFY

Based on Buell, R. W., Campbell, D., & Frei, F. X. (2016). How do customers respond to increased service quality competition? *Manufacturing & Service Operations Management*, 18(4), 585-607.

Review by Seongkyoon Jeong

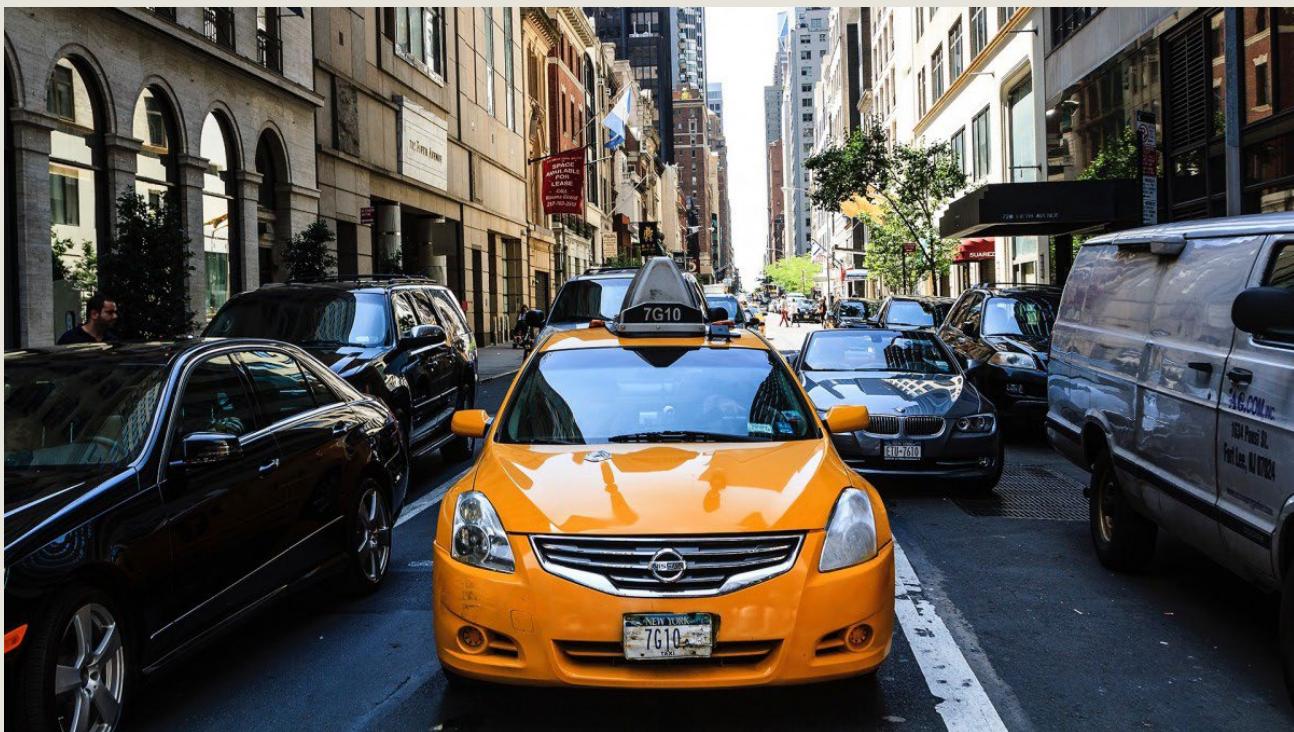
Background

Scholars have investigated the relationship between service quality, customer satisfaction, and customer retention extensively. The previous literature has found that one of the key drivers for the service quality level is competition, implying that an entry of a new service might induce improvement in service quality and increased defection of customers. Even though these relationships are well studied, the direct relationship between service quality and customer's reaction cannot be easily stated. There are several empirical challenges in revealing the link: 1) the need to observe relative service qualities between services, not average qualities, because customers do not sense the qualities in a precise and absolute scale; 2) the need to consider heterogeneous customers, studies should incorporate how an increase in competition brings out heterogeneous impact; and 3) the customer level satisfaction data should be merged with market level data for the analysis.

Key Insights

When does increased service quality competition lead to customer defection? To answer the question, this research addresses the three above-mentioned challenges using novel data of nationwide US bank's customers and market-level competition.

Because customers do not fully grasp service quality in an absolute level across service providers in the market, they sort service providers in the evaluation of services (i.e., they compare service providers). Thus, given that service sensitive customers value the service quality gap between service providers, service quality sensitivity of customers is correlated with relative service quality position in the market. When customers defect, they follow similar quality providers with better options. In other words, customers who value quality are more likely to defect when a new service with higher quality enters. That is, the entry of a superior quality provider leads to customers' defection to the service. Likewise, price sensitive customers do the same when an inferior service quality provider enters the market. The authors predict there might be confounding effects in the relationship between customer profitability and the defection following the entrance of a competitor with high/low quality; yet, the results show that highly profitable customers are more likely to defect when the entry of a superior quality service provider occurs. Overall, this study shows that customers' satisfaction depends on the relative position of the service in the market and that their switching behavior is heterogeneous and driven by competitors that provide better prioritized options.



MINI CASE

AFTER INTRODUCTION OF UBER IN CHICAGO, TAXI CUSTOMERS BECAME MORE SENSITIVE

It is no secret that taxi company profits have taken a major hit because of competition from ride-sharing services such as Uber and Lyft. Unlike taxi drivers, Uber drivers are evaluated right after rides. For that reason, they attempt to provide higher ride service quality not to mention a better economical price. Therefore, it would be no surprise if taxi drivers, in response to the increased competition, attempted to increase their service quality, in terms of driving pattern and manner toward passengers. In another light, because the relationship between a passenger and a cabbie is based on a one-time ride, there could be no incentive for taxi drivers to significantly improve service quality.

Either way, the service quality of taxi drivers would not be expected to decline drastically. However, interestingly enough, the number of complaints about taxi services in Chicago surged noticeably right after the introduction of Uber in 2011. In particular, passengers claimed more numbers of reckless driving. Why did the number of complaints increase despite the fact that taxi drivers might have been incentivized to improve their service quality?

Case: <https://www.theatlantic.com/business/archive/2015/07/uber-taxi-drivers-complaints-chicago-newyork/397931/>

Image: <https://pxhere.com/en/photo/99246>

Remaining Questions

According to the paper, two competing theories exist over the relationship between high customer profitability and the likelihood that customers defect following the entrance of competitors with superior quality. The neglected theory that supports the negative relationship between the profitability and likelihood is based on the switching cost perspective. Old and wealthier customers or customers who use various offerings might face higher switching cost. One could argue that the theory itself is wrong, or the effect is overshadowed by the competing theory based on customer learning and service sensitivity. We cannot be sure either because the results do not measure profitability but use variables such as balance and tenure of service use. Although the data do not include such variables as age of customer, one might be able to investigate the effect of switching cost. Can we measure the link between switching cost and customer profitability? What variables would be good proxy for switching cost?

Want to Know More?

What if a service is part of a bundle for a product? Then, what is the relationship between service

quality and product quality? How would customers respond to service quality? Guajardo et al. (2016) approach this question, using the data of the U.S. automobile industry. They found service quality and product quality have a complementary relationship. That is, customers demand high service quality to make up for low product quality. In addition, competition may drive a change in quality level. Can we model the competition in a game theoretic situation? Chiu et al. (2014) attempt to address this question assuming that firms attempt to maximize their market share under the condition of their given cost structure.

Foundational Classical Studies

Customers have bounded rationality and do not have full market information. Classical modeling papers discuss the sorting effect (Gabszewicz and Thisse 1979, Shaked and Sutton 1982, Sutton 1986, Tirole 1990), on which the hypotheses of this study are based. Previous studies (Fitzsimmons et al., 2006; Israel 2005) argue that customers may not be fully capable of understanding the true service quality, unlike some modeling papers that assume perfect information (Tirole 1990).

References

- Chiu, C. H., Choi, T. M., Li, Y., & Xu, L. (2014). Service competition and service war: A game-theoretic analysis. *Service Science*, 6(1), 63-76.
- Fitzsimmons, J. A., Fitzsimmons, M. J., & Bordoloi, S. (2006). *Service Management: Operations, Strategy, and Information Technology*. New York: McGraw-Hill.
- Israel, M. (2005). Services as experience goods: An empirical examination of consumer learning in automobile insurance. *American Economic Review*, 95(5), 1444-1463.
- Gabszewicz, J. J., & Thisse, J. F. (1979). Price competition, quality and income disparities. *Journal of economic theory*, 20(3), 340-359.
- Guajardo, J. A., Cohen, M. A., & Netessine, S. (2015). Service competition and product quality in the US automobile industry. *Management Science*, 62(7), 1860-1877.
- Shaked, A., & Sutton, J. (1982). Relaxing price competition through product differentiation. *The Review of Economic Studies*, 3-13.
- Sutton, J. (1986). Vertical product differentiation: some basic themes. *American Economic Review*, 76(2), 393-398.
- Tirole, J. (1988). *The Theory of Industrial Organization*. MIT press.

BEHIND-THE-SCENES

INTERVIEW WITH PROF. RYAN BUELL

**How did you come up with this idea?**

Practitioners are constantly responding to changing competitive dynamics in the markets where they serve customers, and although a wealth of theory existed on how customers should respond to service quality competition, surprisingly little research had been conducted on how customers actually respond to it.

What was the biggest challenge in the research and revision?

This project took seven years from start to its ultimate publication. The biggest initial challenge was how to collect data that would help us reliably identify the effect of service quality competition on customers, so that we could perform the analysis. During the review process, the biggest challenge was in reconciling the stylized theoretical models that had been put forward in earlier literatures with what we actually observed in practice. More theoretically-oriented reviewers wished to see us develop new economic models to motivate why we might expect to see the pattern of results we observed. However, we and the more empirically-oriented reviewers viewed the research to be more of an empirical question. Trying to please everyone led to a substantively poorer paper and a late-stage rejection at *Management Science*. However, that experience gave me the opportunity to rewrite the paper, incorporating the lessons we learned from the first review process, which ultimately led to a stronger and better article, and I believe, a more meaningful contribution.

What are the main remaining missing puzzles in this area of research? If any, what is your subsequent, ongoing work in this area of research?

One of the main puzzles that arose from this research, which has driven several ongoing projects, is that our results revealed how different customers can be attracted to different dimensions of a particular firm's service offerings. That means that in some markets, where the firm offers an above-average level of service, its customers are more likely to have selected it based on service quality and are more likely to have higher service expectations. In markets where it has a below-average level of service quality, its customers are more likely to have selected it based on price and are more likely to have lower service expectations. The results were suggestive to us that differences between the needs of customers and the capabilities of the operation serving them might be an important driver of differences in service performance, which is what some of my subsequent research with collaborators has revealed. For example, in one project, differences between customers is shown to explain roughly a quarter of the variance in customer satisfaction with a service firm. In another project, conducted as a field experiment, customers who are shown the trade-offs designed into a firm's service offering make better selection decisions and exhibit significantly higher long-term loyalty.

Buell, Ryan W., Dennis Campbell, and Frances X. Frei. "The Customer May Not Always Be Right: Customer Compatibility and Service Performance." Harvard Business School Working Paper, No. 16-091, February 2016. (Revised March 2018.)

Buell, Ryan W. and MoonSoo Choi. "How Operational Transparency Improves Customer Compatibility." Harvard Business School Working Paper. April 2019.

COMBINING SERVICES AND PRODUCTS TO COMPETE

Based on Guajardo, J. A., Cohen, M. A., & Netessine, S. (2015). Service competition and product quality in the US automobile industry. *Management Science*, 62(7), 1860-1877.

Review by Xiangjing Chen and Seth Washispack

Background

As developed economies becomes heavily service-based, manufacturing companies have followed suit by offering services for their products. Car companies (e.g. Ford, Toyota, etc.) are good examples of such changes. When purchasing a car from these dealers, warranties and service quality become factors when pricing their cars. From studies on product attributes, scholars have found some attributes to be complimentary while others are substitutionary. Does the same type of relationships hold for service attributes for products? If this relationship holds, how can service attributes be added to product offerings?

Key Insights

Using empirical data based on new cars sold between 2001 and 2007, the authors consider how service attributes can complement or substitute for product quality. The authors consider two service attributes: warranty length and after-sales service quality. Their findings suggest that warranties have a significant effect on demand and that the marginal value of an additional year of warranty decreases with product quality and increases with service quality. In other words, warranties act as a substitute for product quality and as a complement to service quality. These findings suggest that firms should define their product and service strategies jointly rather than independently. The authors went on to test how warranties differed among car

manufacturers. They found warranties were more important for American firms than non-American firms. This finding seems consistent with the lower product quality and higher service quality of American firms.

Remaining Questions

In the car market, customers still think of their purchase as mostly a physical product, but in many other markets (e.g., utilities), the service is considered the main purchase (although physical products may also be supplied such as routers for Wi-Fi). When service is considered as the main purchase, will the findings still hold? Will service and product attributes still interact in the same way? How would different product attributes substitute or complement service purchase?

In the service industry, customer expectation is an elusive but important metric. Some of the most loved companies (e.g., Zappos and Nordstrom) are known for elating their customers. In order to continue to elate customers, it is important to understand what attributes lead to customer elation. For example, do product and service attributes differ in their ability to elate customers?

Want to Know More?

Often manufacturers move into services to increase their market share. In order to do this successfully, there are two important considerations. The first is understand how customers decide to switch to



MINI CASE

FORD COMPETES WITH SERVICES: WARRANTIES AND ROADSIDE ASSISTANCE

As foreign car companies entered the US market, US manufacturers began to struggle. Often these companies could not keep up with the product quality of their foreign counterparts such as Toyota. In the wake of these issues, US car makers worked to find other ways to compete. One such way is competing through services (e.g., warranties and after-sales service).

Many “pure manufacture” companies have begun to combine services to compete. In 2006, Ford began to more aggressively promote their service offers as a competitive advantage to their customers. They increased their powertrain warranty from 3-years/36,000

miles to 5-years/60,000 miles giving them the best warranties among their Detroit competitors and putting them on par with Nissan and Toyota. Additionally, Ford added free roadside assistance during the warranty period. Ford seemed to believe customers would find this appealing. Do these additional services act in complementary manner for Ford’s product quality? Or are they substitutionary? Should other businesses follow suit?

Case: <https://www.warrantyweek.com/archive/www20060725.html>

Image: <https://www.flickr.com/photos/jepersmedia/28382564686>

another company. Buell et al. (2016) finds that customers defect at a higher rate from the firm following increased service quality competition. The second consideration is how to offer differentiated services. One way to differentiate services is Guajardo and Cohen's (2018) framework for service differentiation using a company's operating segments.

The idea of manufacturing firms moving into services is known as servitization. Although this can be done for financial reasons, this model could have other benefits. Recently, Örsdemir et al. (2018) demonstrated using a game-theoretic model that servitization can be a win-win strategy (for profits and the environment as it encourages manufacturers to take more responsibility for their

products) when the firm has a sufficiently high operating efficiency. These findings are consistent with previous findings that suggest servitizing has the potential of being a "green business model."

Foundational Classical Studies

Since warranties are an important service attribute considered by the authors, they used Emons (1989) to help explain the economic role of warranties: insurance role, signaling role, sorting role, and incentives role. Additionally, they used a newer study, Dieckmann et al. (2009) who developed the theory of compensatory effects in consumer decision making to motivate this paper's hypothesis that good service compensates consumers for poor product quality.

References

- Agrawal, V. V., & Bellos, I. (2016). The potential of servicizing as a green business model. *I*, 63(5), 1545-1562.
- Buell, R. W., Campbell, D., & Frei, F. X. (2016). How do customers respond to increased service quality competition?. *Manufacturing & Service Operations Management*, 18(4), 585-607.
- Dieckmann, A., Dippold, K., & Dietrich, H. (2009). Compensatory versus noncompensatory models for predicting consumer preferences. *Judgment and Decision Making*, 4(3), 200.
- Emons, W. (1989). The theory of warranty contracts. *Journal of Economic Surveys*, 3(1), 43-57.
- Guajardo, J. A., & Cohen, M. A. (2018). Service differentiation and operating segments: a framework and an application to after-sales services. *Manufacturing & Service Operations Management*, 20(3), 440-454.
- Örsdemir, A., Deshpande, V., & Parlaktürk, A. K. (2018). Is servicization a win-win strategy? profitability and environmental implications of servicization. *Manufacturing & Service Operations Management*, 21(3), 674-691.

INCREASING PRODUCTIVITY: HIRE SOMEONE AT ANOTHER FIRM?

Based on Wu, L., Jin, F., & Hitt, L. M. (2017). Are all spillovers created equal? A network perspective on information technology labor movements. *Management Science*, 64(7), 2973-3468

Review by Chao Wu

Background

The technology industry has evolved rapidly over the last few decades. Gordon Moore described a doubling every year in the number of components per integrated circuit in 1965 (Moore's law). Rapid technology upgrades generate different information systems and tools to improve business productivity. For example, a 1-megabyte hard drive would cost \$1 million in 1967 while it costs about 2 cents today. ERP systems such as SAP and Oracle have successfully built bridges and connect teams within companies. We know today that technology innovation can generate productivity spillovers from early adopters to later ones as spillovers created by the mobility of workers. However, are all spillover effects created equally? In other words, do all skill sets professionals have can be transferable in a similar way?

Key Insights

Using about 10 million resumes filed between 1987-2007 with identified companies' ERP implementation data, this study shows that firms with high network diversity in the IT-labor network are more productive than firms with high network cohesion in the IT-labor network. In other words, as the background diversity of your IT team increase, company's productivity increases. On the other hand, high network diversity in non-IT labor network has no relationship with company's productivity. These results reflect differences in the types of knowledge diffusion facilitated by different

types of labor flows. IT labor enables the transfer of new and innovative firm practices, which benefits from diversity, while non-IT labor flows are more closely associated with implementation of complementary organizational practices, which may benefit from a critical mass of workers with a common knowledge base.

Remaining Questions

Grimpe and Kaiser (2010) show an inverse U-shape relationship between R&D outsourcing and innovation performance. A natural extension from this study could be testing the relationship between IT outsourcing and its impact on firm's productivity. Would there be any differences between these two tests? Intuition suggests that whether IT capability is firm's core competence would moderate the effect of IT outsourcing to its impact on firm's productivity. Would such an intuition hold?

Another research question could be a deeper view on why the IT industry is more related with network diversity compared with non-IT labor. For example, one possibility is that IT industry is very standard compared with other industries. Although there are many different programming languages, software and operating systems, the fundamental logic is very similar thus the transaction cost is low. Another possible explanation is that IT industry is more connected. For instance, websites like GitHub would host and provide a place for IT professionals to post and solve questions.



MINI CASE

THE HIRING WAR IN SILICON VALLEY

There has been different plausible explanations for the increase of labor force mobility. Some argue that it is due to the increase in labor supply; others believe that it is because of the new generation's work attitude. Labor supply and labor endogeneity might be the key reasons here, however, we should not ignore the demand shift of labor market. For example, Tesla has reportedly been poaching employees from Apple, with nearly 150 employees leaving Apple to join Tesla in 2015. It is clear that Tesla didn't hire Apple workers to make a smartphone or computer. Instead, it was the transferable skill that Tesla was looking for. More specifically, Tesla wanted to learn from Apple how to design their car, for instance, touch screen in Tesla's car.

On the other hand, Apple has returned this favor since 2015 by hiring dozens of employees from Tesla every year, with a more diverse range of fields including manufacturing, software engineers and supply chain experts. With the recent acquisition of Drive.ai, it becomes more clear that Apple's target in autonomous car industry. Interestingly, we can see the difference between Tesla and Apple's purposes from their hiring patterns: One aims for transferable skill while the other try to jump in a different industry.

Case: <https://www.businessinsider.com/tesla-apple-hiring-spree-150-2015-2>

Case: <https://www.cnbc.com/2018/08/23/apple-hiring-many-tesla-employees-not-just-doug-field.html>

Image: Shutterstock

Want to Know More?

An early study by Dewan and Kraemer (2000) showed that IT capital investment tends to reflect a positive return in developed countries while a negative return in developing countries. This effect may have changed over time and one possible reason is that the gap between IT talents in developed countries and developing countries is closing. However, it is possible that IT and data analytics have developed so fast that they created more hype than value. Data scientists may quit because they spend too much time on collecting and cleaning data, find it difficult to communicate with non-technical managers, receive unrealistic requests (Brooks-Bartlett, 2018). The misconception of IT and data analytics may eventually lead to the end of data science in business area (Dickerson, n.d.).

Foundational Classical Studies

Different forms of productivity gains have long been studied: Mobility of R&D workers (Almeida and Kogut 1999), buyer-supplier interactions (Bartelsman 1994) and collaboration networks (Powell et al. 1999). This study contributes to the general knowledge of productivity gain. Tambe and Hitt (2013) have documented the effect of direct spillovers from IT workforce between related industries. This paper uses the same data as Tambe and Hitt and utilize the network to show the different productivity gain from IT labor and non-IT labor. In addition, this paper broadly touches on the topic of triadic relationships as an outsized role in improving various innovation and performance outcomes (Aral et al. 2012, Wu 2013). This study also challenges a foundational study by Mithas and Krishnan (2008) who discuss knowledge transfer and best practices sharing knowledge.

References

- Wu, L., Jin, F., & Hitt, L. M. (2017). Are all spillovers created equal? A network perspective on information technology labor movements. *Management Science*, 64(7), 3168-3186.
- Brooks-Bartlett, J. (2018) Why data-scientists are leaving their jobs – Towards Data Science Retrieved from <https://towardsdatascience.com/why-so-many-data-scientists-are-leaving-their-jobs-a1f0329d7ea4>
- Dickerson, J. (n.d.) Data Science dead in 5 years or less - Retrieved from <https://www.linkedin.com/pulse/data-science-dead-5-years-less-justin-b-dickerson-phd-mba-pstat/>
- Dewan, S., & Kraemer, K. L. (2000). Information technology and productivity: Evidence from country-level data. *Management Science*, 46(4), 548-562.
- Grimpe, C., & Kaiser, U. (2010). Balancing internal and external knowledge acquisition: The gains and pains from R&D outsourcing. *Journal of Management Studies*, 47(8), 1483-1509.

IS COMPETITION ALWAYS GOOD?

Based on Wani, Malhotra, & Venkataraman. (2018). Impact of competition on process of care and resource investments. *Journal of Operations Management*, 57, 23-35.

Review by M. Ryan Hatton and Xiangjing Chen

Background

Competition is generally believed to improve quality, however, the impact of competition on the performance of hospitals is uncertain. Competition can affect a hospital's Process of Care (PoC), which is an important dual measurement of performance. First, competition impacts PoC directly stimulating innovations which provide better care for patients. Second, competition impacts the hospital's investments in resources, which can indirectly affect the PoC.

For example, if a hospital loses its patients to a competing substitute hospital, the original hospital will have to focus on a limited set of priorities (Ocasio, 1997). In a highly competitive market, a hospital's executives tend to focus more on short-term goals, such as financial well-being and market share, which may hinder the long-term performance quality of the hospital. So, is competition always good for hospitals? Will competition improve or deteriorate a hospital's PoC?

Key Insights

The purpose of this study is to investigate the impact of competition on process of care and resource investments. One of the key contributions of this paper to existing literature is introducing the concept, Process of Care, which is a marker for unmeasured quality and is linked to measured quality, such as mortality rate. The authors found that competition has a negative impact on both process of care and resource investments. Additionally, they found that

resource investments, both in nurses and in health information technology, have positive impacts on process of care. The base-line results suggest that hospital executives should take PoC into account because PoC can improve downstream outcome measures such as readmissions and mortality; on the other hand, policy makers should reconsider the strategy that encourages competition to improve quality, because this strategy may not always work well when a "medical arms" race exists.

Remaining Questions

When discussing resource investments, the authors primarily analyzed the investments in registered nurses and in health information technology, but investment in doctors is also another important investment to consider. How would the results differ if they included the investments in doctors as well?

Building on the topic of resource investments, those in technology/equipment can be accumulated year by year, which means even if the investments are lower in the current year than the last year, the effect of the investments in technology can be higher this year than the effect of the investments in technology from the last year. In other words, the decrease in investments in technology may not be due to high competition but due to unnecessary. How would the accumulated effect influence the results?



MINI CASE

IS THIS A HOSPITAL OR A HOTEL?

The New York Times released a quiz to test whether readers can differentiate between a hotel and a hospital. In the past, such a quiz would not be challenging, however, nowadays as hospitals have improved their hospitality, it can be difficult to identify a hospital versus a hotel. According to the New York Times, the St. Joseph's Hospital in Highland, Ill., is a "\$63 million community hospital, patients all enjoy private rooms, with couches, flat-screen TVs and views of nature. Its lobby features stone fireplaces and a waterfall."

In a highly competitive market, hospitals found that patient can be attracted easily by observable changes, such as new equipment and/or

amenities, and patient demand correlates better to amenities than actual quality of care. It is therefore reasonable for hospital executives to invest more in hospitality. Patients, on the one hand, benefit from the competition and enjoy better services in hospitals now, such as spas, comfortable private rooms, and even nail salons, but on the other hand, those services and amenities are not necessary for patients who want to be cured as soon as possible. So, are patients actually receiving better care?

Case: <https://archive.nytimes.com/www.nytimes.com/2013/09/22/sunday-review/is-this-a-hospital-or-a-hotel.html>

Image: <https://images.app.goo.gl/gheftLPtpB3gdyRA>

Want to Know More?

While competition amongst hospitals has created an alternative approach to healthcare and providing quality of care, there are cited advantages in other works which highlight advantages to competition. Xu et al. (2015) find that competition between hospitals can be good for patients because competition could stimulate innovation to continue improvements to service quality.

For those interested in a broader view of the advantages and disadvantages of competition, Stucke, M. (2013) discuss such in an overall business setting that is not limited to the healthcare market. Stucke highlights that while competition may be beneficial for society as a whole – though

sometimes harming individuals – there are also scenarios of sub-optimality which competition can also produce.

Foundational Classical Studies

There are two competition theories which contribute to the basis for this research. One theory states that competition between hospitals is good for patients as it stimulates innovation and improves quality (Tirole, 1988). The other theory believes that competition is bad for patients because it may force hospitals to focus on cost shifting, which may lead to low quality, high costs, and inefficiency (Kessler and McClellan 1999, Robinson, 2011, and Porter and Teisberg, 2006).

References

- Ocasio, W. (1997). Towards an attention-based view of the firm. *Strategic Management Journal*. 18 (Summer Special Edition), 187–206.
- Porter, M. and Teisberg, E. (2006). *Redefining Health Care*. Boston, Mass.: Harvard Business Press.
- Robinson, J. (2011). Hospitals respond to Medicare payment shortfalls by both shifting costs and cutting them, based on market concentration. *Health Affairs*, 30(7),1265-1271.
- Rosenthal, E. (2019). Is this a hospital or a hotel?. [online] Archive.nytimes.com. Available at: <https://archive.nytimes.com/www.nytimes.com/2013/09/22/sunday-review/is-this-a-hospital-or-a-hotel.html> [Accessed 19 Aug. 2019].
- Stucke, M. (2013). Is competition always good?. *Journal of Antitrust Enforcement*, 1(1), pp.162-197.
- Xu, T., Wu, A. W., & Makary, M. A. (2015). The potential hazards of hospital consolidation: implications for quality, access, and price. *JAMA*, 314(13), 1337-1338.
- Kessler, D. and McClellan, M. (2000). Is hospital competition socially wasteful?. *The Quarterly Journal of Economics*, 115(2), 577-615.
- Schwartz, M. (1990). The theory of industrial organization by Tirole, Jean. Cambridge, MA: MIT Press, 1988, pp. xii, 479, isbn 0-262-20071-6. *Managerial and Decision Economics*, 11(2),131-139.

ACTORS IN THE INNOVATION PLAY: WHAT'S THEIR MOTIVATION?

Based on Eggers, J. P., & Kaul, A. (2018). Motivation and ability? A behavioral perspective on the pursuit of radical invention in multi-technology incumbents. *Academy of Management Journal*, 61(1), 67–93.

Review by Seongkyoon Jeong and M. Ryan Hatton

Background

Many scholars have spotlighted radical innovation due to the disruptive effects it brings on incumbent firms. Radical innovation also enhances competence when firms recombine it with their existing competence. Given the importance, firms attempt to exploit their complementary resources and avoid losing out to new entrants by pursuing radical innovation. Although we know the purpose and effects of radical innovation, a set of key questions have not been fully addressed: what makes firms want to pursue radical innovation?

Key Insights

Based on the behavior perspective on risk and innovation, this study argues that as firms compare their technological performance to that of other firms, they become motivated to innovate radically. In particular, when the performance is close to the average performance of the other firms, the motivation is more likely to be triggered, and the aspiration effect is asymmetric: when the performance is below average, firms are more inspired. Furthermore, these effects are strengthened as the factors of risk-taking attitude is involved. The authors argue that technological diversification and overall performance are associated with the strength of the relation. Using patent data, the authors examine the effects at the patent level.

Remaining Questions

One big question is whether this research handles the quantity of innovation. The patent level analysis surely shows that the likelihood of radical invention is associated with aspiration. Although these results suggest that firms' preference in innovation type, it does not tell the quantity of innovation. Does aspiration also change the count of radical invention? Furthermore, a more fundamental question is remaining: an invention is not a direct measure of innovation. "Radicalness" might exist in the project or product level as well, although invention might reflect some aspects of the levels.

Another question lies in the aspiration mechanism: how do heterogeneously firms react to the other firms and their innovation? For example, it is not surprising that many firms implicitly specify their rivals and benchmark these firms. Firms could be more motivated by the technology performance of these predefined rivals. In addition, although firms are able to sense overall performance of industry level technological performance, radical innovation is more visible and brings out more critical and sharp shock to the technological rivals. Thus, not just mere technological performance, but specifically the level of radical innovation by rival firms could critically motivate the focal firm to pursue radical innovation. Furthermore, the social comparison process might be more prominent for small start-up



MINI CASE

THE INNOVATIVE HUNTER HAS NOW BECOME THE INNOVATOR'S HUNTED

Twelve years ago, almost to the day, Steve Jobs turned the technology world on its head. Having already revolutionized one product (computers) with the Macbook and then adding a second with iPods (music), Jobs was on a stage demonstrating – or better said blowing the lid off of – a third in cell phones with the iPhone. With the invention of the iPhone, Apple had single-handedly set a standard for “app-technology” and in essence created a cell phone platform which revolutionized thinking within the wireless telecommunications industry.

Had Apple not felt the sting of stagnating iPod sales, would it have been so radical in its iPad and, ultimately, iPhone inventions and development? The iPhone touch screen phenomena certainly supports the success of this radical innovation and the current high standard of innovation represented in the wireless telecommunications industry today.

Case: <https://www.cnet.com/news/iphone-at-10-apple-steve-jobs-make-iphone-history-remembering/>

Image: Shutterstock

companies, which are expected to introduce radical innovation to the industry. What roles do size and type of firms would play in the social comparison and creation of radical innovation?

Want to Know More?

The lead author published a review paper on aspiration (Eggers and Park, 2018), which might be very helpful for researchers who are interested in this topic and about to begin a new topic associated with this theme. In addition, Egger extended this behavior view onto market entrance (Egger and Suh, 2018) finding that the impact of negative feedback might differ by how much firms are experienced in the entered domains.

While the relative performance of peer firms aspires firms to pursue radical innovation, such aspirations by peer's technology can appear in various forms. Typically, as observing emergent technology with game-changing impact, firms aspire not only to pursue radical innovation but also to imitate such

technology. Bigelow et al. (2018) address when and how latter moves occur and what explains the order.

Foundational Classical Studies

Prior to this study, Cyert and March (1963) provided the fundamental foundation of the behavioral theory of firm, which conceptualizes the aspiration-level adaptation process. Using this view, Lant (1992) and Mezias et al. (2002) empirically demonstrated how aspiration level is set: the previous aspiration level, performance feedback, and social comparison are the main drivers. Greve (2003) provides a useful framework for the calculation of aspiration. Based on this measurement, the authors operationalized the construct empirically. Fleming (2001) provides an important piece of the nature of radical invention: the unique recombination of previous technological knowledge is riskier to take in terms of technological impact. Using this view, the authors of this paper construct the main variable for radical invention.

References

- Bigelow, L., Nickerson, J., & Park, W. Y. (2018). When and how to shift gears: dynamic trade-offs among adjustment, opportunity, and transaction costs in response to an innovation shock. *Strategic Management Journal*.
- Cyert, R. M., & March, J. G. (1963). *A Behavioral Theory of the Firm*. Prentice Hall, Englewood Cliffs, NJ.
- Eggers, J. P., & Park, K. F. (2018). Incumbent adaptation to technological change: the past, present, and future of research on heterogeneous incumbent response. *Academy of Management Annals*, 12(1), 357-389.
- Eggers, J. P., & Suh, J. H. (2018). Experience and behavior: how negative feedback in new versus experienced domains affects firm action and subsequent performance. *Academy of Management Journal*, in press.
- Fleming, L. (2001). Recombinant uncertainty in technological search. *Management Science*, 47(1), 117-132.
- Greve, H. R. (2003). A behavioral theory of R&D expenditures and innovations: evidence from shipbuilding. *Academy of Management Journal*, 46(6), 685-702.
- Lant, T. K. (1992). Aspiration level adaptation: An empirical exploration. *Management Science*, 38(5), 623-644.
- Lielacher, Alex. (2018). Could Ethereum really go to zero? Retrieved from <https://bravenewcoin.com/insights/could-ethereum-really-go-to-zero>
- Mezias, S. J., Chen, Y. R., & Murphy, P. R. (2002). Aspiration-level adaptation in an American financial services organization: A field study. *Management Science*, 48(10), 1285-1300.



BEHIND-THE-SCENES

INTERVIEW WITH PROF. J.P. EGGERS

How did you come up with this idea?

The first realization was that the patent data offered a way to identify how potentially radical (or at least how rare) any given patent is, in terms of knowledge recombination. Once we had established that, we quickly realized that many of the most surprising combinations actually came from large incumbent firms, largely counter to received wisdom in the innovation literature. So we sought to understand when and why incumbents were willing to invest in these crazy ideas, and how successful they were. The distinction between motivation (trying something new) and ability (the potential to do it well) really became central to our story.

What was the biggest challenge in the research and revision?

The first real challenge was convincing reviewers that “another patent paper” could actually be different and interesting. That required taking a very different approach from the early decade of patent data papers. The other challenge was figuring out which of the many directions we

could go with the measure was the right one for now. But, once we got to AMJ, the whole review team was actually incredibly helpful in getting us to focus.

What are the main remaining missing puzzles in this area of research?

Our measure, while general and useful, is definitely a very blunt instrument. I think that following this paper up with more fine-grained, intra-industry data would be great. More generally, figuring out how behavioral theory and the resource based view fit together is an important topic that hasn’t been liked at nearly enough.

If any, what is your subsequent, ongoing work in this area of research?

Aseem and I have a VERY slow moving project looking at how firms search and combine knowledge that builds off the intuition of the measure. I’m moving a few projects forward that continue to link behavioral theory and RBV. And a number of people have downloaded the data from my website and found cool uses for the measure.

RESOURCE BUILD-UP AND ALLOCATION

Although organizations develop countless ideas for improving their operational performance, many of these ideas will never be pursued because of constraints. With a finite amount of resources, organizations decide how to build-up these resources and where to allocate them. While classical studies on this topic consider how many resources were optimal and which projects to select, newer studies consider more nuances in the location decision, more realistic contexts (e.g., multiple, cyclic projects), and broader industry sectors. In this section, we review recent studies that highlight these new settings.

Topics in This Section

To Locate, To Relocate, or To Reshore:

No Matter How You Say It, Why Should It Be in a High Cost Country?

Based on Ketokivi, M., Turkulainen, V., Seppälä, T., Rouvinen, P., & Ali-Yrkkö, J. (2017). Why locate manufacturing in a high-cost country? A case study of 35 production location decisions. *Journal of Operations Management*, 49, 20-30

Production Management Empirical Research Manufacturing Sector

Acquire, Retain, and Provide Quality Service:

Does a Firm Have to Choose How to Allocate between the Three?

Based on Afèche, P., Araghi, M., & Baron, O. (2017). Customer acquisition, retention, and service access quality: Optimal advertising, capacity level, and capacity allocation. *Manufacturing & Service Operations Management*, 19(4), 674–691.

Service Management Analytical Research Service Sector

Which Project to Prioritize or Delay?

Based on Browning, T. R., & Yassine, A. A. (2016). Managing a portfolio of product development projects under resource constraints. *Decision Sciences*, 47(2), 333-372.

Innovation Management Analytical Research Service Sector

Killing Two Birds with One Stone: Healthcare Cost and Quality

Based on Ding, D. X. (2014). The effect of experience, ownership and focus on productive efficiency: A longitudinal study of U.S. hospitals. *Journal of Operations Management*, 32(1–2), 1–14.

Behavioral Operations Empirical Research Bio-medical Sector

Non-Profit Organizations' Funding: Where to Use the Money?

Based on Devalkar, S. K., Sohoni, M. G., & Arora, P. (2017). Ex-post funding: How should a resource-constrained non-profit organization allocate its funds? *Production and Operations Management*, 26(6), 1035-1055.

Production Management Empirical Research Non-Profit Organization

TO LOCATE, TO RELOCATE, OR TO RESHORE: NO MATTER HOW YOU SAY IT, WHY SHOULD IT BE IN A HIGH COST COUNTRY?

Based on Ketokivi, M., Turkulainen, V., Seppälä, T., Rouvinen, P., & Ali-Yrkkö, J. (2017). Why locate manufacturing in a high-cost country? A case study of 35 production location decisions. *Journal of Operations Management*, 49, 20-30

Review by Seongkyoon Jeong and M. Ryan Hatton

Background

Recent phenomena suggest manufacturing location decisions be reexamined: 1) western companies have brought their plants “back home”, and 2) economic value no longer solely explain location decisions as opposed to what we observed in 1980s. Up to date, several perspectives have been known to influence logical decisions: locational, organizational, and temporal perspective. Locational perspective refers to factors such as proximity to market, access to knowledge, and relative costs of production inputs. Organizational perspective pertains to firm’s network and inter-functional interdependencies, such as how internal corporate stakeholders’ considerations outweigh external factors for relocation of a R&D location. Temporal perspective centers around issues such as time-based competition, lead times, and demand patterns. Is there anything else than these perspectives? What else is explaining today’s counter-intuitive location decision trend?

Key Insights

The authors offer a fourth perspective which takes a deeper dive into the micro-level context that can be categorized into coupling, formalization, and specificity. This decision perspective offers an approach built on the strategic decision-making

literature along with the behavior theory of the firm (Cyert & March 1992) to present three dyadic relationships: production-supply, production-development, and production-market. These dyadic relationships provide the components necessary to introduce theoretical concepts. With these theoretical vantage points, this study analyzes 35 different final assembly location decisions in Finland to explore the actual decision context and factors.

As a means to better inform location decision-makers in firms, crucial insights regarding coupling, formalization, and specificity have been presented. More specifically, an important implication is the variability of the three constructs; for example, high formalization (by increased codifiability) or low coupling (by introduced modularity) can decrease the probability of establishing a factory in a high cost country. Such managerial activities will impact the decision of factory location.

Remaining Questions

What is the role of digital infrastructure in location decision? Although spatial distance is a still important factor of location decision, it is reasonable to note that the recent rise of information technology has enabled locating manufacturing plants in low labor



MINI CASE

AN APPLE A DAY, BRINGS THE IPAD BACK TO STAY... IN THE US.

Apple has made a very consistent effort to relocate jobs to the U.S. from China. With clear labor cost and manufacturing technology advantages maintained overseas, this decision to reshore comes with some question marks. Regarding overseas manufacturing positions, Steve Jobs once said "Those jobs are gone!" Job's successor, (pictured above) Tim Cook, has systematically increased domestic manufacturing investment with a most recent January 2018 announcement¹ to invest over \$30 billion in capital expenditures in the United States over the next 5 years. A portion of this investment is committed to the Advanced Manufacturing

Fund to boost domestic manufacturing from \$1 billion to now \$5 billion. This investment would allegedly create over 20,000 new manufacturing jobs at existing Apple campuses in addition to a new office location Apple had not yet determined. Since labor costs in the United States are higher, relatively speaking to Asian countries, why has Apple decided now to reshore Apple Manufacturing jobs?

Case: <https://www.forbes.com/sites/stevedenning/2012/12/07/why-apple-and-ge-are-bringing-manufacturing-back/#592c2a746c4b>

Image: <https://dbpost.com/wp-content/uploads/2019/03/tim1-848x500.jpg>

cost countries. In particular, such technology has reduced coordination cost significantly, making it possible for firms to handle more complex global network in operations and supply chain management. One can investigate the relationship between location-wise diversity/complexity and technological advance in digital domains.

Want to Know More?

A few more studies look at this interesting phenomenon: backshoring. Kinkel and Maloca (2009) attempt to address the same question as this paper, using German firm samples. Likewise, Mauro et al. (2018) approach this topic, using multiple cases. In addition, numerous new research venues associated with this topic were discovered recently. One particular focus in location decision in the era of big data and artificial intelligence.

Although this research stream is relatively new, Ancarani and Mauro (2018) and Müller et al. (2018) attempt how robots and AI are enabling backshoring. Technological advance in labor-replacing technologies has lowered the portion of labor cost, enabling a new type of backshoring in high labor cost countries.

Foundational Classical Studies

A number of studies provide the basis for this paper: Williamson, (1979) addresses transaction cost economics, associated with specificity; Weick (1976) explains the loose-tight continuum, the framework for interdependence; Sanchez and Mahoney (1996) shows technological modularity and its management; Bohn (1998) elaborates the managerial meaning of codifiability.

References

- Ancarani, A., & Di Mauro, C. (2018). Reshoring and industry 4.0: How often do they go together?. *IEEE Engineering Management Review*, 46(2), 87-96.
- Bohn, R. E. (1998). Measuring and managing technological knowledge. *The Economic Impact of Knowledge*, Butterworth-Heinemann, Boston, 295-314.
- Cyert, R.M., March, J.G., 1992. *A Behavioral Theory of the Firm*, second ed. Prentice-Hall, Englewood Cliffs, CA.
- Di Mauro, C., Fratocchi, L., Orzes, G., & Sartor, M. (2018). Offshoring and backshoring: A multiple case study analysis. *Journal of Purchasing and Supply Management*, 24(2), 108-134.
- Foerstl, K., Kirchoff, J. F., & Bals, L. (2016). Reshoring and insourcing: Drivers and future research directions. *International Journal of Physical Distribution & Logistics Management*, 46(5), 492-515.
- Kinkel, S., & Maloca, S. (2009). Drivers and antecedents of manufacturing offshoring and backshoring—A German perspective. *Journal of Purchasing and Supply Management*, 15(3), 154-165.
- Müller, J., Dotzauer, V., & Voigt, K. I. (2017). Industry 4.0 and its impact on reshoring decisions of German manufacturing enterprises. In *Supply Management Research* (pp. 165-179). Springer Gabler, Wiesbaden.
- Sanchez, R., & Mahoney, J. T. (1996). Modularity, flexibility, and knowledge management in product and organization design. *Strategic management journal*, 17(S2), 63-76.
- Weick, K. E. (1976). Educational organizations as loosely coupled systems. *Administrative Science Quarterly*, 1-19.
- Williamson, O. E. (1985). The economic institutions of capitalism. Firms, markets, relational contracting. In *Das Summa Summarum des Management* (pp. 61-75). Gabler.

ACQUIRE, RETAIN, AND PROVIDE QUALITY SERVICE: DOES A FIRM HAVE TO CHOOSE HOW TO ALLOCATE BETWEEN THE THREE?

Based on Afeche, P., Araghi, M., & Baron, O. (2017). Customer acquisition, retention, and service access quality: Optimal advertising, capacity level, and capacity allocation. *Manufacturing & Service Operations Management*, 19(4), 674–691.

Review by Seongkyoon Jeong and M. Ryan Hatton

Background

There are practical problems with applying the solid triumvirate of service operations (i.e., customer acquisition, customer retention, and service access quality) to practices. First, there is no clarity about how we define service value and value of a customer and how these measures depend on service quality. Second, firms and internal departments within firms often ignore necessity of precise assumption on service target and level. Third, it is unclear whether to prioritize a certain type of customers with some basis. Finally, these entities have uncoordinated decisions in these dimensions.

Key Insights

Using a Markovian model for customer response to service access quality, this study investigates three interrelated strategic decisions for a profit-maximizing firm in this situation: 1) how much to spend on new customer acquisition, 2) how much capacity to deploy, and 3) how to allocate this capacity and tailor service access quality levels to different customer types? While previous studies do not link such dimensions at once but treat them separately, this study links makeup and value of the customer base both to the capacity allocation, an approach that allows us to check service probabilities

and customer base transitions of all types. The results of this study give us following implications; firms need to understand how customer attributes affect the optimal policy; and marketing-focused policies that ignore the effect of service probabilities of customer life value (from the enter-repeat-and-leave) may reduce profits significantly.

Remaining Questions

The approach of this study allows us to derive which customers to deny within given constraints. However, there are a number of assumptions and requirements for the approach. The authors assume stationary environment; this is a necessary condition for this kind of model. In other words, will the probabilities in the model stay the same over time? In addition, running this model requires previous data. What if we have no previous data for the estimation of the parameters? For example, we can imagine a situation in which a firm launches a new service and plans to predict the future pattern using this model.

Want to Know More?

It has been almost two decades since service operations have emerged as one of the operations management topics. While the modeling framework of this study pertains to the fairly generalizable and



MINI CASE

HOW TO SECURE CUSTOMERS: THE RISE OF CHICK-FIL-A

A contemporary lesson in fast-food industry dominance can be reviewed in the current work displayed by the self-proclaimed "Home of the Original Chicken Sandwich" Chick-fil-A. The customer acquisition plan for Chick-fil-A has ancient roots and very humble beginnings but the overall mission is quite simple: every life has a story and going the extra mile with customers creates magical happenings. Doing more business in 6 days (Chick-fil-A is closed on Sundays) than McDonalds does in 7 days (\$4MM avg sales per unit vs. \$2.67MM for

McDonald's according to [qsrmagazine.com](https://qsrmagazine.com/2017/07/06/chick-fil-a-is-taking-over-the-world/) in 2017), could Chick-fil-A be providing a template for Afeche et al. (2017)? Aside from Chick-fil-A's customer-centric mission, how can application of Afeche et al. (2017) assist Chick-fil-A to increasing marketing efficiencies?

Case: https://www.sas.com/en_us/insights/articles/marketing/a-lesson-in-customer-service-from-chick-fil-a.html

Image: Shutterstock

extensive nature of service operations, recent studies in service operations call for dimensions beyond service retention and investment. In particular, researchers actively publishing in Journal of Service Management summarized previous research (Victorino et al., 2018) and provided new impactful directions (Field et al., 2018). For example, Field et al. (2018) suggest that one big understudied and unconsidered area in modeling such a customer follow is service supply network. Just as other operations management studies consider supply of physical goods, so service operations model can extend onto the domain of inter-organizational service resource transfers.

Foundational Classical Studies

This study uses several foundational studies. First, as for the modeling framework, it adds more

dynamic perspective of service operations to Sun and Li (2011), which address the customer's attributes and their impact on service duration and customer retention. A more dynamic perspective of service operations enables this study to demonstrate the learning process of service organization in dynamic environment. Second, this study borrows the Markov decision process formulation from de Véricourt and Zhou (2005), which use calling back the service center as a proxy concept for quality. Finally, it employs the conceptualized trade-off between productivity and customization in service and relationship management, suggested by Rust and Chung (2006). Rust and Chung (2006) suggest the increasing importance of analyzing customer lifetime value (CLV) and managing the firm's customer equity; this view provides strong theoretical background to Afèche et al. (2017).

References

- Field, J., Victorino, L., Buell, R., Dixon, M., Meyer Goldstein, S., Menor, L., Pullman, M., Roth, A., Secchi, E. and Zhang, J. (2018). Service operations: what's next?. *Journal of Service Management*, 29(1), pp.55-97.
- Sun, B., & Li, S. (2011). Learning and acting on customer information: A simulation-based demonstration on service allocations with offshore centers. *Journal of Marketing Research*, 48(1), 72-86.
- De Véricourt, F., & Zhou, Y. P. (2005). Managing response time in a call-routing problem with service failure. *Operations Research*, 53(6), 968-981.
- Rust, R. T., & Chung, T. S. (2006). Marketing models of service and relationships. *Marketing Science*, 25(6), 560-580.
- Victorino, L., Field, J., Buell, R., Dixon, M., Meyer Goldstein, S., Menor, L., Pullman, M., Roth, A., Secchi, E. and Zhang, J. (2018). Service operations: what have we learned?. *Journal of Service Management*, 29(1), pp.39-54.



BEHIND-THE-SCENES

INTERVIEW WITH PROF. PHILIPP AFÈCHE

How did you come up with this idea?

The problem was seeded in our mind during conversations with managers of a credit card company. The company was running advertising campaigns to attract new customers. Prospective new customers were served by the same call center that served existing (base) customers. Therefore, a successful campaign that resulted in many calls from potential new customers, negatively affected the access quality to the call center for all customers. Managers were wondering (i) how to properly assess the value of a call from new versus base customers, as well as customers' life-time value; (ii) how these metrics depend on the service access quality; and (iii) how to manage access to the call center in a way that accounts for the relationships among capacity allocation, service access quality, and customer value and behavior. To address these questions, we developed and studied a model that integrates customer relationship management (CRM) with service capacity management.

What was the biggest challenge in the research and revision?

The first version of the paper restricted attention to a single set of homogeneous base customers. We then generalized the model to accommodate multiple types of base customers, and to allow transitions among customer types in response to their access service quality. Generalizing the initial model and results was challenging but proved to be worthwhile: Capturing service-quality-dependent switching among base customer types allows us to account for intricate relationships between the capacity allocation, the service quality history, the composition of the customer base, and important customer attributes such as loyalty, purchase frequency, and monetary value.

What are the main remaining missing puzzles in this area of research?

Broadly, we think that the interface between CRM and service operations is vastly under-explored and holds great potential for innovative research. In particular, the literature overwhelmingly ignores the feedback loop between service quality measures that are controlled by a firm's operations and the evolution of its customer base and demand. This paper contributes to addressing this shortcoming. More specifically, here are a couple among several research opportunities that we outline in the paper: First, whereas the paper focuses on steady-state analysis in a stationary environment, one promising research perspective is to study the problem in a non-stationary environment, as the firm anticipates or responds to changes in the business environment. Correspondingly, time-dependent service quality metrics and policies should reflect the evolution of customer value over time. Second, an interesting and important empirical problem is to estimate our model parameters based on data. By quantifying the effects of service access quality attributes on customer value and behavior, such estimates are instrumental for the practical implementation of capacity management policies that reflect CRM principles.

If any, what is your subsequent, ongoing work in this area of research?

One current research effort considers how various forms of self-service, whereby customers participate in the service delivery process, affect the interplay among service access quality, capacity management, and customers' repeat purchase behavior and value. Increasing customer participation in service delivery processes may involve important trade-offs. On one hand, increasing customer participation may improve service access quality by reducing the demand placed on the firm's capacity. On the other hand, increasing customer participation may compromise service delivery quality if customers lack the skills required to perform tasks or exhibit significant variability in these skills. Beyond our own efforts, we hope that this paper contributes to fostering more work at the interface of CRM and service operations management.

WHICH PROJECT TO PRIORITIZE OR DELAY?

Based on Browning, T. R., & Yassine, A. A. (2016). Managing a portfolio of product development projects under resource constraints. *Decision Sciences*, 47(2), 333-372.

Review by Han Lu & Chao Wu

Background

Firms face a difficult decision when allocating resources among a portfolio of Product Development (PD) projects. Even if there are sufficient resources for the average needs of all of the projects, different projects still contend for specific resources at particular times, causing delays to individual projects and the whole portfolio. So how should managers give priority to different projects? Many people have tried to answer this question, but the vast majority assume projects are non-cyclical (i.e. not iterative). In reality, many PD projects are cyclical. Does this cyclical nature determine a vastly different way to manage a portfolio of PD projects? If so, how are they different?

Key Insights

This study designed experiments on 31 different Priority Rules (PR) which are based on industry knowledge and evaluated two outcomes: 1) average project delay and 2) overall portfolio delay. The results showed a few interesting and practical implications. First, cyclical projects are different from non-cyclical projects in that different PRs should be applied. Second, to minimize average project delay, managers should apply “minimum worst-case slack” with limited resources. In other words, managers should add slack up to lead-time that happens in worst case scenario, which allows sufficient time for projects to finish. Finally, to minimize overall portfolio delay, “longest activity

from longest project” is recommended with limited resources. This is quite common when finding the critical path in project management.

Remaining Questions

This paper studies the priority rules on portfolio project management and it tests 31 different rules on iterative projects. An interesting avenue for future research is how to design incentives for project managers so that they would truthfully share the resource constraints and project delay. Another interesting question is how much we can learn from iterative projects. If knowledge management in iterative projects accumulate more useful information, does it mean we should assign more difficult projects in the beginning and allocate more resources to maximize learnings?

Want to Know More?

Hall et al. (2015) show an interesting study about project portfolio selection. It discussed that some projects have uncertain return and thus bring managers more factors to consider what projects to select under same portfolio. Bhattacharjya et al (2013) discuss the potential benefits from managers learning information about the dependent projects. Intuitively, if managers know that their upstream project is delayed, they may slow down their pace to have higher quality and follow up closely with upstream project.



MINI CASE

WHEN PROJECTS NEVER FAIL – THE CHALLENGE WITH PROJECT PORTFOLIO MANAGEMENT

In 2000, management in United Illuminating Company (UI) realized the importance of improvement of business process, especially in project selection, prioritization. Thus, the new president of UI created the project management center of excellence in early 2001. One of the key challenges for project prioritization is to understand and correctly assess the value of each project. The project portfolio management center of UI spent six months to assemble and understand the project list. Then each member of the team would individually force rank all the projects in terms of importance related to the core business value. Then the project managers would have presentation to "lobby" the project portfolio team about their projects

before the final decision is made. While this method is easy to implement for even large size companies, there is a clear drawback of this decision process. This method ignores the inter relationship among different projects. For instance, an IT database update may not be as important as new project development if we only focus on each project itself. However, IT database could provide a better support for other business function and even other projects. Thus, some projects would need to be considered together instead of individually.

Case: <https://www.pmi.org/learning/library/journey-project-portfolio-management-case-study-1070>

Image: Shutterstock

Foundational Classical Studies

There are three stream of research this study relies on: PD project portfolio management, iteration in PD projects, and resource-constrained multi-project scheduling. The authors use Cooper et. al (2002) to situate this article in the first stream. Cooper et. al (2002) noted there are four goals in PPM which include maximizing portfolio value, balancing portfolio, aligning portfolio and allocating resources. However, when faced with chronic, day-to-day resource contentions among projects, managers will find little guidance for prioritization

rules from PPM literature (Blichfeldt & Eskerod, 2008). To situate themselves in the second stream (iteration in PD projects), the authors mention how the conventional view on project management (scheduling) assume that projects are acyclical and do not account for iteration. (Meredith & Mantel, 2012). For the last stream, resource-constrained multi-project scheduling, the authors rely on Hartmann & Briskorn (2009) who optimize performance of a set of projects that draw on a common pool of resources.

References

- Browning, T. and Yassine, A. (2015). Managing a portfolio of product development projects under resource constraints. *Decision Sciences*, 47(2), pp.333-372.
- Hall, N., Long, D., Qi, J. and Sim, M. (2015). Managing underperformance risk in project portfolio selection. *Operations Research*, 63(3), pp.660-675.
- Bhattacharjya, D., Eidsvik, J. and Mukerji, T. (2013). The value of information in portfolio problems with dependent projects. *Decision Analysis*, 10(4), pp.341-351.
- Shaltry, P. E., Drew, E. J., & Horgan, B. (2002). Journey to project portfolio management: a case study. Paper presented at Project Management Institute Annual Seminars & Symposium, San Antonio, TX. Newtown Square, PA: Project Management Institute.
- Cooper, R. G., Edgett, S. J., & Kleinschmidt, E. J. (2002). *Portfolio Management for New Products* (2nd ed.). Cambridge, MA: Perseus Publishing. Basic Books.
- Blichfeldt, B. S., & Eskerod, P. (2008). Project portfolio management – there's more to it than what management enacts. *International Journal of Project Management*, 26(4), 357–365.
- Meredith, J. R., & Mantel, S. J. (2012). *Project Management* (8th ed.). New York: Wiley.
- Hartmann, S., & Briskorn, D. (2009). A survey of variants and extensions of the resource-constrained project scheduling problem. *European Journal of Operational Research*, 207(1), 1–14.



BEHIND-THE-SCENES

INTERVIEW WITH PROF. TYSON BROWNING

How did you come up with this idea?

Ali Yassine and I had been thinking about multi-project management, iterative projects, and resource contention since the late 1990s in conjunction with our work on design structure matrices. As we learned more about resource-constrained multi-project scheduling, we found that we had to go much deeper than we had originally realized, which led to our publications 2010a and 2010b (cited in this paper) on acyclical projects: those papers provided the launching point for this one. We also wanted to try to reduce the gap between (1) the enormous amount of operations-research-oriented, optimization-based research on resource-constrained project scheduling and (2) the practical realities that have severely limited that research's applicability.

What was the biggest challenge in the research and revision?

We faced several big challenges. One is that some editors of other journals (from which this manuscript was previously rejected) thought that research on priority rules or even resource-

constrained project scheduling was no longer interesting to the wider audience of operations management. They were prematurely dismissive. Another challenge was that, by bridging two established areas of research (RCPS and iterative product development), we would get reviewers who knew about one of these areas but not the other. We had to work very hard to get the case for this paper heard and appreciated.

What are the main remaining missing puzzles in this area of research?

I think the next step in this research area should be empirical. Do the proposed priority rules work as advertised in practice? What other practical considerations should influence the applications of priority rules? Also, how should we develop adaptive priority rules that account for project and portfolio dynamics?

If any, what is your subsequent, ongoing work in this area of research?

Unfortunately, we have not had time to push further in this area of research. We hope to do so at some point, and we hope others will see the many interesting opportunities and be inspired to do so.

KILLING TWO BIRDS WITH ONE STONE: HEALTHCARE COST AND QUALITY

Based on Ding, D. X. (2014). The effect of experience, ownership and focus on productive efficiency: A longitudinal study of U.S. hospitals. *Journal of Operations Management*, 32(1–2), 1–14.

Review by Seongkyoon Jeong and Seth Washispack

Background

The United States is notoriously known as a country with high healthcare costs. To improve the healthcare cost burden, healthcare reformation has been widely acknowledged and studied by policy and management scholars. Traditionally, the operations management literature considers quality and cost as a trade-off. That is, cost reduction may worsen the quality improvement, yet learning is typically known as a tool to both reduce cost and improve quality. Are cost reduction and quality improvement always trade-offs? Can learning help to both reduce cost and improve quality?

Key Insights

Using a longitudinal (1996-2010) sample of hospitals across the US, the authors investigated the role of learning in operating cost reduction and quality improvement. In addition, the authors investigated the role of the focus of operations on the learning effect. The empirical analysis shows that hospitals learned to control operating costs and to improve productive efficiency through cumulative patient volume. Although the authors find a trade-off between quality and cost, they find these trade-offs differ for hospitals with different ownership. Specifically, the authors find that “proprietary hospitals have taken the shortcut to improve quality on easily identifiable dimensions such as hospital environments while cutting corners on hard-to-

measure dimensions such as clinical quality.” They also find clinical focus has a positive impact on hospital performance as highly focused hospitals learned faster than their counterparts in controlling operating costs suggesting improvement through either focusing on particular patient types or on specialized operations.

Remaining Questions

Is service quality a given opportunity or a consequence of good healthcare service? The authors used service quality (“experience) until the previous year to avoid this challenge. Yet, in the real world, customers are more likely to stick to service providers with reasonable prices and quality; viable service providers expand and accumulate more experiences. In that regard, some studies show that experience is the consequence of “proven choices” (Anand et al. 2016). Is experience truly the source of improvement?

This study demonstrated support for the cost-quality trade-off using two years of data, but are cost and quality truly trade-offs? As can be seen from the mini case, hospitals can work to improve quality and costs separately without sacrificing the other significantly. Then, what are the roles of information and regulation in the cost-quality trade-off? How are information and better practices accumulated and transferred in the learning process?



MINI CASE

IMPROVING CLINICAL CARE WITH SMALL CHANGES

The reasons for low quality and high costs in the US include preventable issues. In 2018, 90,000 people died from hospital-acquired infections while over 17,000 malpractice lawsuits are filed annually. Additionally, pharmaceutical spending was estimated somewhere between \$323 and 477 billion in 2016.

Some academic hospitals have started to combat these issues with small changes. For example, one hospital increased the number of generic prescribed drugs from 75% to 98% simply by changing the default option in their EHR system. Another hospital focused on decreasing the number of malpractice

lawsuits using a program called CARe, which taught medical staff to apologize and explain patient care mistakes. To increase handwashing compliance, one hospital installed an electronic monitoring system, which increased handwashing compliance from 40% to 70%. These changes seem to make improvements without substantial costs. Does the cost-quality tradeoff exist? What does learning have to do with these results?

Case: <https://news.aamc.org/patient-care/article/small-changes-big-results/>

Image: <https://media.defense.gov/2015/Aug/04/200126698/780/780/0/150804-F-XE708-016.JPG>

Want to Know More?

What is the actual process improvement mechanism in healthcare? Some studies look at the inside of the operations. One potential research stream to consider answering this question is studies on considering the intersection of service design and process management. Ding (2015) demonstrates that service design and process management have synergistic effects in a healthcare setting.

Although experience is an important component for learning, there are other factors that can increase learning. Kovach and Fredendall (2015) consider Six Sigma projects in the behavioral health domain.

They find training (hands-on) and support from others induce learning.

Foundational Classical Studies

Although a more recent study, the authors lean on work by Pisano et al. (2001), which was one of the early studies demonstrating organizational learning in the healthcare environment. Moving outside of the healthcare realm, the authors mentioned a seminal study on learning in industrial settings (Argote et al., 1990). Additionally, the authors use an early study on learning in industrial setting (Argote, 1996) to support their use of cumulative patient volumes as an input for learning.

References

- Anand, J., Mulotte, L., & Ren, C. R. (2016). Does experience imply learning? *Strategic Management Journal*, 37(7), 1395-1412.
- Argote, L., Beckman, S. L., & Epple, D. (1990). The persistence and transfer of learning in industrial settings. *Management Science*, 36(2), 140-154.
- Argote, L. (1996). Organizational learning curves: persistence, transfer and turnover. *International Journal of Technology Management*, 11(7-8), 759-769.
- Ding, X. D. (2015). The impact of service design and process management on clinical quality: An exploration of synergistic effects. *Journal of Operations Management*, 36, 103-114.
- Kovach, J. V., & Fredendall, L. D. (2015). Learning during design for six sigma projects—a preliminary investigation in behavioral healthcare. *Engineering Management Journal*, 27(3), 109-123.
- Pisano, G. P., Bohmer, R. M., & Edmondson, A. C. (2001). Organizational differences in rates of learning: evidence from the adoption of minimally invasive cardiac surgery. *Management Science*, 47(6), 752-768.

NON-PROFIT ORGANIZATIONS' FUNDING: WHERE TO USE THE MONEY?

Based on Devalkar, S. K., Sohoni, M. G., & Arora, P. (2017). Ex-post funding: how should a resource-constrained non-profit organization allocate its funds? *Production and Operations Management*, 26(6), 1035-1055.

Review by Seth Washispack and Seongkyoon Jeong

Background

Early-stage, resource-constrained non-profit organizations (NPOs) can have difficulty raising funds from individual donors because of uncertainty concerning the efficiency and effectiveness of the new NPO. According to Janus (2018), 81% of nonprofit leaders she surveyed considered access to capital as their biggest challenge. Usually, NPOs wait until their projects are fully funded before starting the project, but some NPOs are trying a new funding approach, "ex-post funding." Ex-post funding helps to demonstrate the NPOs' effectiveness and efficiency by starting early phases of a project before the project has been fully funded. The NPOs share the costs and outcomes from the early phases with the donors to encourage donations. This practice becomes important when the results are time-sensitive since waiting until a project is fully funded could decrease the benefit of the project. If an NPO starts a project before it receives all the funding, it opens itself up to risk: the completion of the project is dependent on continued funding. There is a trade-off between the timing of the projects (benefits) and the risk (costs). With this trade-off in mind, when is the ex-post approach beneficial? How should funds be appropriated when the ex-post approach is implemented?

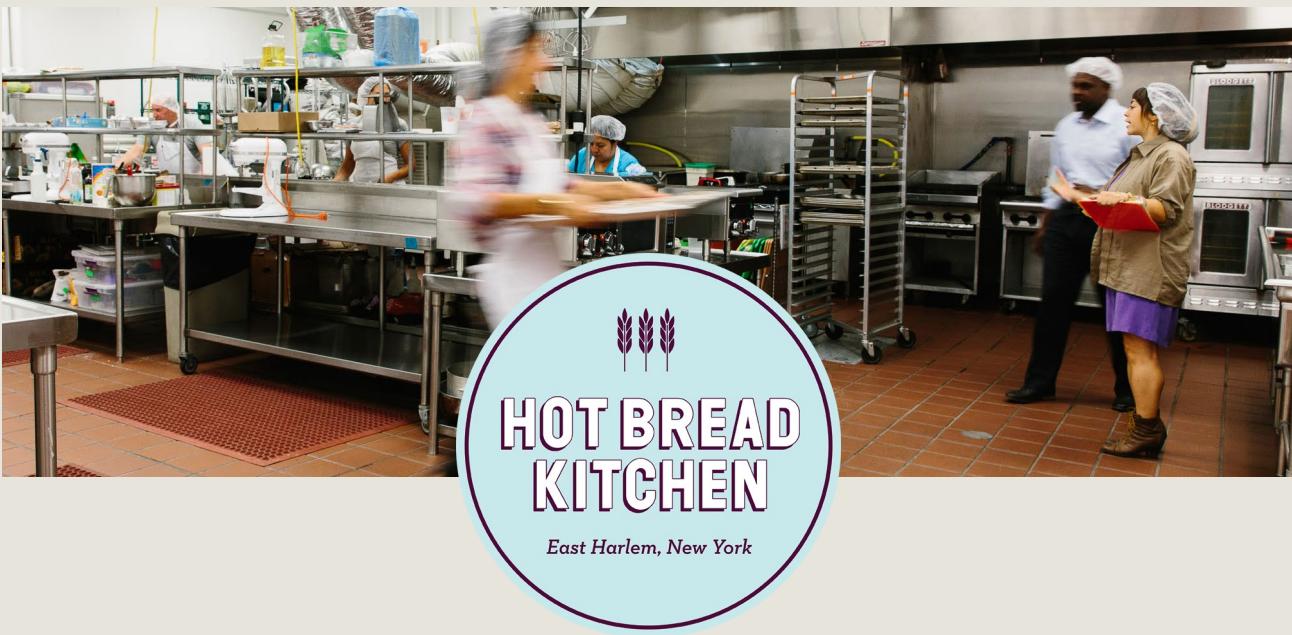
Key Insights

This study uses an analytical model to understand when the ex-post approach can be used to provide

the greatest benefit to the public. The authors assume funding is the limiting resource for the implementation of a project (where the NPO focuses on only one project). Additionally, they model two different types of donor behavior: 1) traditional donors who do not need to be shown results before donating and 2) ex-post donors who need to see results before donating. The study finds that as the number of implementations stages increase the more donations are needed from traditional donors to buffer the risk of the project. Additionally, the study analytically demonstrates two benefits of the ex-post funding approach: 1) reduced dependence on traditional donors, 2) benefits can start to be delivered before the project is fully funded. Another finding focuses on the use of the initial funds suggesting that it may not be optimal to use all the initial funds for the implementation phase but to use some of them on the fixed cost of the NPO. Overall, the study finds that in many cases an ex-post funding approach is more beneficial than the traditional funding approach; in some cases, an NPO can deliver up to twice the benefit using the ex-post approach even with small initial funds.

Remaining Questions

Good results were found when considering a single project with a high probability of success, but there are nonprofit programs that have a higher degree of risk. What would be the impact of different



MINI CASE

HOT BREAD KITCHEN: HYBRID BETWEEN OPERATIONAL INCOME AND FUNDING

Hot Bread Kitchen is a New York-based program to train low-income women to be bakers. The program is funded by selling the bread made by the trainees. The initial goal for the program was for the company to become entirely financially self-sustainable. If such a status was possible to achieve, it might be beneficial for both Hot Bread Kitchen and its trainees. However, running the program with only their bread sales would make it possible for Hot Bread Kitchen to only run the very basic program only. In order to run a more robust program, Hot Bread Kitchen could consider fundraising. As Janus (2018) pointed out, most nonprofit organizations are not only unskilled at fundraising but also less willing to engage in fundraising experimentation, because fundraising can alter the perception of nonprofit organizations. Is that what Hot Bread Kitchen

wants? Like other nonprofit organizations, Hot Bread Kitchen's ultimate mission is not making the organization self-sustainable but creating the biggest impact, namely training as many people as possible. Hot Bread accepted philanthropic capital in addition to the earned income, so as to enlarge the program scope and coverage. After all, surviving without funding is a tough mission for nonprofit organizations, especially when there is no way to create income out of their own operations. As seen in this case, fundraising is not easy and often does not meet the target amount. In such a case, what alternatives should organizations think of?

Case: <https://hbr.org/2018/06/using-design-thinking-to-help-nonprofits-fundraise>

Image: <https://hotbreadkitchen.org/>

chances of success? How would the benefits of ex-post funding changes as the programs become riskier? Additionally, the authors only considered one program. In reality, nonprofits usually have multiple projects going on. How does the multiplicity of projects and the overlapping of these projects affect the results? Does the benefit of the ex-post approach change with the number of projects using this approach in one organization? Since the same funding model is not required for each project within the same organization. How should non-profit organizations choose the projects using the ex-post approach? How and under what conditions would the risk of using this approach for one project exacerbate or mitigate the risk of another project?

This model considered when there are two discrete donor types. As in most cases when there are two opposites, there is most likely a continuum of donors between the traditional donor and the ex-post donor. If this continuum of donors was included in the model, how would this affect the effectiveness of the ex-post funding approach? Could this help to suggest a strategy for NPOs who serve different types of donors thus informing NPO strategy in different industries?

Want to Know More?

Let's consider how funding affects long-term success of NPO projects. In a recent study, Kohnke

et al (2017) found the affordability (e.g. funding) has little direct impact on the "long-term surgical care outcome." This demonstrates the importance of NPOs focusing on their mission (outcome) in light of their funding situation. Another study, Burkart et al. (2016) considers how funding affects success of NPO specifically for humanitarian organizations. These authors develop a framework for how funding categories (e.g., source, allocation, etc.) affect different performance metrics of NPOs.

It's also important to understand that the traditional funding approach can be implemented in many different forms. For example, List and Lucking-Reiley (2002) found two different traditional funding approaches, "seed money" and a refund policy, increase donations. These two variations of the traditional funding approach could also be adapted to the ex-post funding approach.

Foundational Classical Studies

This study intersects multiple domains, but the two dominating literature streams are the non-profit stream and resource constraint project stream. To ground the study in the non-profit domain, the authors used Andreoni (1998) who created a "theory of charitable fund-raising". To place themselves in the resource constraint project stream, they lean on Kolisch et al (1995) who considered resource constraints for medical NPOs.

References

- Andreoni, J. (1998). Toward a theory of charitable fund-raising. *Journal of Political Economy*, 106(6), 1186-1213.
- Burkart, C., Besiou, M., & Wakolbinger, T. (2016). The funding—Humanitarian supply chain interface. *Surveys in Operations Research and Management Science*, 21(2), 31-45.
- Janus, K. K. (2018). *Social Startup Success: How the Best Nonprofits Launch, Scale Up, and Make a Difference*. Hachette UK.
- Kohnke, E. J., Mukherjee, U. K., & Sinha, K. K. (2017). Delivering long-term surgical care in underserved communities: The enabling role of international NPOs as partners. *Production and Operations Management*, 26(6), 1092-1119.
- Kolisch, R., Sprecher, A., & Drexl, A. (1995). Characterization and generation of a general class of resource-constrained project scheduling problems. *Management Science*, 41(10), 1693-1703.
- List, J. A., & Lucking-Reiley, D. (2002). The effects of seed money and refunds on charitable giving: Experimental evidence from a university capital campaign. *Journal of Political Economy*, 110(1), 215-233.

BEHIND-THE-SCENES

INTERVIEW WITH PROF. SRIPAD DEVALKAR



How did you come up with this idea?

The key motivation and idea for the paper came from interactions with a local non-profit organization. As a small non-profit competing for the limited pool of donor funds, they wanted to differentiate themselves by promising to be completely transparent on how the funds were being used and reduce the uncertainty for donors by seeking funds against delivered results. The latter idea is what we term as "Ex-post funding".

What was the biggest challenge in the research and revision?

The main challenge was to develop a parsimonious model that captured the essence of the novel funding mechanism. Ideally, we would have wanted to test the predictions of the analytical model using data from fund raising campaigns conducted by the NPO. However, as the NPO was quite young there wasn't enough historical data available to do a clean empirical analysis.

What are the main remaining missing puzzles in this area of research?

There have been many innovations in fund raising mechanisms adopted by NPOs. In addition, donors have also been experimenting with how to disburse funds to ensure the money generates the highest possible impact. There are challenges because of information

asymmetry (regarding the NPO's efficiency, primarily) and uncertainty (exogenous factors that are beyond the control of the NPO and donor that impact project outcome). In addition to traditional OM models that address these issues, there are unique characteristics of NPOs that require new modeling approaches to be adopted.

Beyond funding, there are many operational issues that NPOs grapple with. Given that NPOs are usually severely constrained on resources, e.g., financial, managerial capability, and do not have easy access to capital and labor markets to obtain these resources, strategies to improve operational performance have to account for these constraints.

If any, what is your subsequent, ongoing work in this area of research?

We have another paper that compares different funding mechanisms where the donor is the leader and decides which funding mechanism to adopt. Apart from that, one of the authors on this paper is working on projects related to improving the effectiveness of the volunteer recruitment process for NPO working in the educational sector while another is working on designing organ donation value chains and how NPOs should balance trade-offs between providing advisory and service delivery efforts.

OPERATIONS SCHEDULING AND TIMING



The appropriate scheduling and time of operations are important factors for business success. Good scheduling can lead to reduced costs while well-timed operations allow for appropriate deployment of initiatives. Classical studies in this area often focus on the topics of inventory and production management (e.g., project scheduling, workforce scheduling, etc.). While studies on these topics are included, the consideration of the timing of service events is also reviewed. The new studies we reviewed from the classical topic areas focused on new fulfillment channels, the consideration of when to adopt industry standards, and how the acceleration of project deadlines affects project costs.

Topics in This Section

Mixing Different Fulfillment Channels: Just What the Customer Wants!

Based on Lawson, B., Pil, F., & Holweg, M. (2018). Multi-modal order fulfillment: Concept and application. *Production and Operations Management*, 27(2), 269-284.

Inventory Management Empirical Research Manufacturing Sector

Timing Matters: The Effect of Time Gap between Service Events on Customer Responses

Based on Sivakumar, K., Li, M., & Dong, B. (2014). Service quality: The impact of frequency, timing, proximity, and sequence of failures and delights. *Journal of Marketing*, 78(1), 41-58.

Service Management Empirical Research Service Sector

Early and Late Six Sigma Adoptions

Based on Jacobs, B., Swink, M., & Linderman, K. (2015). Performance effects of early and late six sigma adoptions. *Journal of Operations Management*, 36, 24 -257.

Production Management Empirical Research Manufacturing Sector

Does Working Faster Reduce or Increase Cost? Both Can Happen

Based on Hawk, A., & Pacheco-de-Almeida, G. (2018). Time compression (dis) economies: An empirical analysis. *Strategic Management Journal*, 39(9), 2489-2516.

Production Management Empirical Research Manufacturing Sector

MIXING DIFFERENT FULFILLMENT CHANNELS: JUST WHAT THE CUSTOMER WANTS!

Based on Lawson, B., Pil, F., & Holweg, M. (2018). Multi-modal order fulfillment: Concept and application. *Production and Operations Management*, 27(2), 269-284.

Review by Xiangjing Chen and Marc Ryan Hatton

Background

The age-old adage in retail has been “the customer is always right!” While that has been taken to mean a few different things. Build-to-order (BTO) fulfillment method allows companies to meet customers’ customized needs; Build-to-forecast (BTF), on the other hand, reduces the waiting time as far as possible. However, these fulfillment methods are not perfect as they pertain to customer trade-offs between how long the customer waits for their custom ordered products and the actual custom features they ordered. With the trade-offs, which fulfillment method should companies use? Or, if there is a better fulfillment method?

Key Insights

Lawson et al. investigate the concept and application of customer order fulfillment in a hybrid modal of customization to optimize system-wide outcomes. Set in an industry where the customer’s preferences are always deal-breakers, this study examines individual auto-sales with OEM, a global automotive producer. Using an empirical study in the automotive industry allowed Lawson et al. to discover important features of build-to-order and build-to-forecast fulfillment methods as they pertain to customer trade-offs between how long the customer waits for their custom ordered

car and the actual custom features they ordered. This investigation found that build-to-order (BTO) and build to forecast (BTF) could “fruitfully coexist” within the same organization” through the unifying feature of mass customization using an “open order pipeline” referred to as a “virtual-build-to-order” (VBTO). The VBTO allows a “win-win” scenario for both the customer and the producer. The customer can see the BTF’s (those produced in stock based on previous demand history and inventory) simultaneously with BTO’s which are in existence currently, including in those imminent to production, currently in production, finished production, and sitting on showroom floors. The producer can maintain an integrated approach which eliminates guesswork on order-to-delivery while providing more information for better informed decisions on compromises with product fit and the customer’ willingness to wait.

Remaining Questions

The common way to apply the BTF method is that after knowing what type of product is the most popular one in the previous selling period, the producer can produce this certain type of product more for the future producing period. This method may work well in the high-tech industry since consumers tend to have similar demand on the main features of high-tech products. In contrast, it



MINI CASE

“IF THEY WILL BUY IT, WE WILL BUILD IT”

Henry Ford, the founder of Ford Motor Company, is known as the father of mass production. Interestingly, his great grandson, Bill Ford, announced a massive revitalization initiative to change the traditional build-to-forecast to build-to-order. Bill Ford said, “‘If they (customers) will buy it (Ford motors), we will build it’ is right. ‘If you build it, they will buy it’ is business as usual, and that’s wrong.”

Besides Ford Motor Company, many other companies have succeeded in applying build-to-order, such as Dell Inc., Cirrus Design Corp., England Inc., and Karsten Manufacturing Corp.

Build-to-order and mass customization are expected to be the trend in the manufacturing industry in 21st century. David Anderson, P.E., president of Build-to-Order Consulting (Cambria, CA) claims that build-to-order production builds customized products on-demand and is ideal for manufacturers that are faced with any of these challenges: product variety, unreliable forecasts, inventory problems, customization, and response time.

Case: <https://www.assemblymag.com/articles/84357-the-build-to-order-challenge>

Image: Shutterstock

may not work well in the fashion industry where consumers may have heterogeneous demand with short life cycle. What are the advantages and disadvantages of BTF in other industries? What product attributes affect the BTF implementation?

There is also an opportunity to examine the relationship between product fit uncertainty and consumers' lead-time elasticity of demand (in other words, sensitivity to waiting time). Furthermore, how do firms—in this case automotive producing

firms—effectively implement the VBTO or just the combination of BTO and BTF?

Another concern with the BTF method is the incentive of information sharing issue. For example, a company has two branches locating in different area. While these branches compete in sales, they may not have incentive to share their customer demand information with each other, hence resulting in incomplete and/or inaccurate information for demand forecast. How would this information deficiency affect the usefulness of the BTF method?

In addition, how to define the relevant metrics to capture the performance of VBTO implementation? Can we use existing metrics in BTO and BTF, or because of the combination, defining new metrics is needed?

Want to Know More?

Huang et al (2017) developed an analytical framework to study the economic value of mass customization strategy and investigate the interaction between demand learning and preference learning.

Beemsterboer et al (2016) examined the benefits of a hybrid planning approach without priority for either make-to-order or make-to-stock, and characterized optimal policies and decisions for manufacturers based on their Markov Decision Process model.

References

- Lawson, B., Pil, F., & Holweg, M. (2018). Multi-modal order fulfillment: concept and application. *Production and Operations Management*, 27(2), 269–284.
- Altendorfer, K., & Minner, S. (2013). A comparison of make-to-stock and make-to-order in multi-product manufacturing systems with variable due dates. *IIE Transactions*, 46(3), 197–212.
- Beemsterboer, B., Land, M., & Teunter, R. (2016). Hybrid MTO-MTS production planning: An explorative study. *European Journal of Operational Research*, 248(2), 453–461.
- Alptekinoglu, A., & Corbett, C. J. (2010). Leadtime-variety tradeoff in product differentiation. *Manufacturing & Service Operations Management*, 12(4), 569–582.
- Schwartz, H. S. (1989). Future perfect, by Stanley M. Davis. Reading, MA: Addison-Wesley, 1987, 243 pp. \$16.95.
- Human Resource Management, 28(1), 145–147.
- Huang, T., Liang, C., Wang, J. (2017). The value of “bespoke”: demand learning, preference learning, and customer behavior, *Management Science*, 64(7), 3129–3145.

Altendorfer (2014) developed a model to capture the characteristics of a single-stage hybrid production system. “Hybrid” in this article means either make-to-order production system with safety stocks, or a make-to-stock production system with advance demand information. The author found that a pure make-to-order policy gets more favorable to a pure make-to-stock policy if “inventory holding costs increase, backorder costs decrease, the mean customer required lead time increases, or the processing rate increases”.

Foundational Classical Studies

Although more contemporary, Alptekinoglu and Corbett (2010) find that Build to Customer Order can enhance links between Manufacturing Operations and Customer needs. Alptekinoglu et al. use a dynamic programming approach to model the optimal product portfolio for integrated product variety, delivery lead time, and pricing decisions- all elements present in the BTO and BTF models.

A more classical study, Davis (1987) describes the feature of mass customization is that customers are treated as individuals and their needs are met individually, but these customized needs can be embedded within the established manufacturing process, which is exactly where Lawson et al. pick up and continue in their empirical study with multi-modal order fulfillment.

TIMING MATTERS: THE EFFECT OF TIME GAP BETWEEN SERVICE EVENTS ON CUSTOMER RESPONSES

Based on Sivakumar, K., Li, M., & Dong, B. (2014). Service quality: The impact of frequency, timing, proximity, and sequence of failures and delights. *Journal of Marketing*, 78(1), 41-58.

Review by Seth Washispack and Seongkyoon Jeong

Background

Since the 90s, companies and scholars have been interested in aspects of service delivery, but there is a knowledge gap in the understanding of how distributional patterns of service delight/failure affect customers' service quality perceptions. After all, customers face multiple events in one service encounter, both failures and delights. How should service firms manage the timing of these events that happen in the same service encounter? Is it better to tell about service failures all at one time or slowly over the service encounter? When is the best time to delight the customer after a failure has occurred?

Key Insights

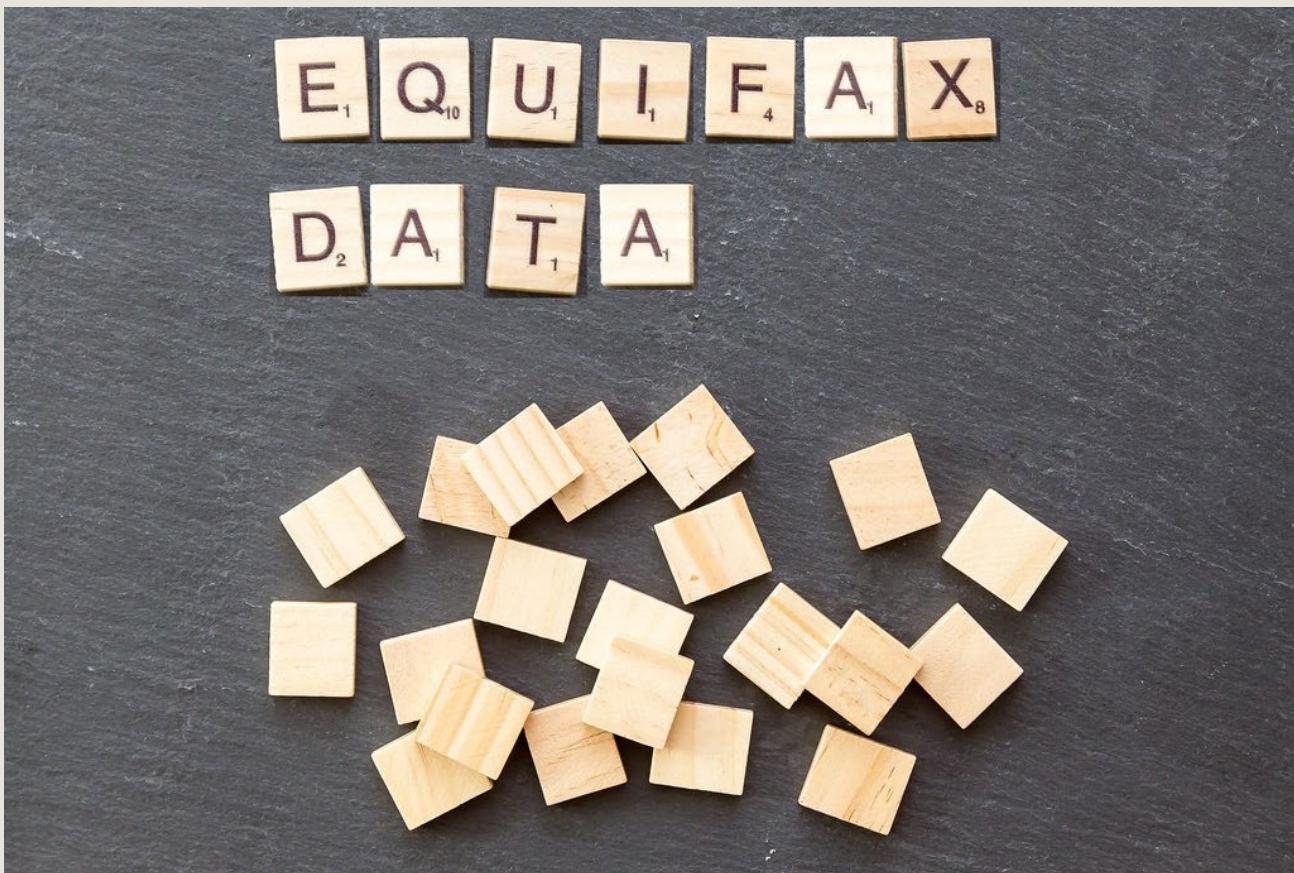
The authors consider four aspects of distribution patterns: frequency, timing, proximity, and sequence. The authors use prospect theory to conceptually understand the effect of these patterns. From prospect theory, the authors assume that the slope of the loss curve is greater than the slope of the gain curve for the same magnitude of service failure/delight because of loss aversion. This assumption is important for their some of their findings: 1) early stage failure is better than late stage failure while late stage delight is better than early stage delight; 2) early stage failure is worse than late stage failure; late stage delight is worse than early stage delight;

3) closer service failures are better than further service failures; further service delights are better than closer service delights; 4) the negative impact of a service failure is larger than the positive impact of a service delight; 5) service failure followed by a service delight is better than the opposite order; this result diminishes as the time between the two events increases.

Remaining Questions

This study addresses the nature of customer responses due to the consecutive service events, either delight or failure, and provides implications based on the prepositions. Although this study does not directly suggest the possibility of strategic control of service news, one can easily argue that firms might opportunistically release the service related information to influence customers' perceptions. Do firms actually release news in this type of manner? If so, are they successful in manipulating perceptions?

Consider the case of a cyber security data breach. Due to the information asymmetry, it might be difficult for customers to figure out whether cyber security issues have happened or not. Given the nature, firms can announce the data breach case at a strategic timing, such as right after another failure event, or release after positive news (e.g.,



MINI CASE

SOONER OR LATER? WHAT SHOULD EQUIFAX HAVE DONE IN THE BREACH REPORTING?

Equifax is a consumer credit reporting agency collecting and aggregating information on individual customers and businesses. It deals with more than 800 million customers worldwide. In September 2017, Equifax announced that they had been hacked and that more than 140 million users' data including their full names, Social Security numbers, birth dates, addresses, and driver license numbers were leaked. That was not the end of the tragedy. In March 2018, Equifax announced that it found 2.4 million additional victims in the last cyber

security breach. It took six months to announce such news since the initial announcement. Should Equifax have announced these findings together or at two separate times (as they did)? How would customer perceptions change by the timing of their announcement?

Case: <https://www.usatoday.com/story/money/personalfinance/2018/03/01/equifax-finds-additional-2-4-million-americans-impacted-2017-breach/384381002/>

Image: https://live.staticflickr.com/4510/37208957542_eb42157415_b.jpg

earning surprise). If they behave so, what is the impact of the strategic delay? How does the stock market react? Additionally, how does the sources of announcement (e.g., a company news release vs. news article leak) affect the eventual quality perception?

Want to Know More?

The authors mention “exploring the boundary conditions.” These could be explored through the integration of operation strategy frameworks and their micro theory. For example, Dixon et al. (2017) experimentally test part of timing hypothesis from Sivakumar et al. (2014). In addition, an important assumption in this article is that perceived service quality in the long-term remains static. Published a few years after this article, Gijsenberg et al.

(2015) demonstrated that the perceived service quality is dynamic (instead of static) in the long run. Supporting the findings from Sivakumar et al. (2014), the authors found even when a positive event follows a negative event the net effect on perceived service quality is negative.

Foundational Classical Studies

This paper relies heavily on prospect theory (Kahneman and Tversky, 1979) to understand how the “distribution patterns of service failures/delights” impact a customer’s service quality perceptions. Tax, Brown, and Chandrashekaran (1998) helped kicked start the scholarly interest of customer reactions to service failure, which was foundational for this study.

References

- Dixon, M. J., Victorino, L., Kwortnik, R. J., & Verma, R. (2017). Surprise, anticipation, and sequence effects in the design of experiential services. *Production and Operations Management*, 26(5), 945-960.
- Gijsenberg, M. J., Van Heerde, H. J., & Verhoef, P. C. (2015). Losses loom longer than gains: Modeling the impact of service crises on perceived service quality over time. *Journal of Marketing Research*, 52(5), 642-656.
- Kahneman, D. & Tversky, A. (1979). Prospect theory: An analysis of decisions under risk. *Econometrica*, 47(2), 263–291.
- Sivakumar, K., Li, M., & Dong, B. (2014). Service quality: The impact of frequency, timing, proximity, and sequence of failures and delights. *Journal of Marketing*, 78(1), 41-58.
- Tax, S. S., Brown, S. W., & Chandrashekaran, M. (1998). Customer evaluations of service complaint experiences: implications for relationship marketing. *Journal of Marketing*, 62(2), 60-76.

BEHIND-THE-SCENES

INTERVIEW WITH PROF. K. SIVAKUMAR

**How did you come up with this idea?**

Failure and delight are relevant topics in the increasingly important services domain. However, there was no comprehensive theoretical work to examine the various patterns of failures and delights. Furthermore, the literature lacked a comprehensive conceptual framework that could function as a platform for further empirical work. Recognizing this gap was the motivating reason for the paper.

What was the biggest challenge in the research and revision?

Two challenges we faced: (1) How to organize a complex paper that focuses on the frequency, timing, proximity, and sequence of failures and delights. Compared to our initial submission, we were greatly helped by a thorough, challenging, and constructive review process. (2) The revision primarily hinged upon our ability to provide mathematical proofs for all our propositions. We were able to accomplish this

by some careful thinking and implementation – as a result, we feel that this is one of the few papers published in JM with a technical appendix involving mathematical derivations.

What are the main remaining missing puzzles in this area of research?

Our paper provided a basic platform for thinking about the patterns of failures and delights. Much further work remains to understand the boundary conditions that are customer-specific, environment-specific, and situation-specific. In fact, empirical validation of our model invariably will involve these boundary conditions that will capture the nuances in our general model.

If any, what is your subsequent, ongoing work in this area of research?

In the future, some possible questions to investigate are catastrophic failures and the differential effects of patterns of failures and delights for services in different tiers.

EARLY AND LATE SIX SIGMA ADOPTIONS

Based on Jacobs, B., Swink, M., & Linderman, K. (2015). Performance effects of early and late Six Sigma adoptions. *Journal of Operations Management*, 36, 24 -257.

Review by Marc Ryan Hatton and Xiangjing Chen

Background

Administrative innovations, which include practices such as quality management, matrix management, zero-based budgeting, and certifications, are important for business process and operating performance. Companies need to decide whether, when, and how they adopt the innovations. Of course, there is a trade-off in all such adoptions: *early adoption* can lead to “first mover” advantages such as access to limited information and a nice head start on the learning curve. However, early adopters do have more uncertainty of success and less experience of successful implementation altogether. For late adopters, there are also tradeoffs to consider: *late adopters* enjoy access to more information (wisdom) shared from successes and mistakes of implementations over time, but they don’t get to enjoy initial financial gains which early adopters might have captured with adoption timing. In the context of Six Sigma, which adopters (early vs. late) perform better? What environmental conditions allow these adopters to perform better?

Key Insights

This paper uses Six Sigma as an example to demonstrate the importance of timing for administrative innovation adoption and the factors that affect a company’s ability to benefit from Six Sigma. In the analysis, the authors use an event study methodology to examine the abnormal financial return associated with the adoption timing of Six Sigma process improvement programs. It classifies early adopters as adopters that implemented Six

Sigma prior to 1997 and late adopters as adopters that implemented Six Sigma in 2001 or later. The results show that on average, late adopters experienced significantly greater performance gains than early adopters. In addition, the advantages enjoyed by late adopters were moderated by certain environmental and structural characteristics of a firm. To be specific, late adoption is favorable when firms operate in the following conditions: 1) firms are in low-velocity industries, where production processes and component technologies are slow and predictable; 2) firms primarily sell in B2B (business-to-business) markets as opposed to B2C (business to customer); and 3) firms maintain good financial performance prior to adoption and are large firms.

Remaining Questions

As mentioned by the author in the paper, one of the future research opportunities is to investigate the timing of other innovations and to compare Six Sigma and other innovations. Expanding on this research question, Terziovski and Guerrero (2014) investigated the timing of product and service innovation with respect to certifications. However, why are the timings impacts so different? In addition, when assessing the advantages of early/late adoptions, we should also consider the network effect as a part of early mover advantage. While this study assumes no spillover effect of early adoption, one can imagine early adopters create a network of connections or spillover to downstream or upstream firms. Specifically, are there lessons from any retail clothing channels, which rely so



MINI CASE

HONEYWELL: THE EARLY ADOPTER OF SIX SIGMA

Honeywell, a multinational company that provides engineering services and aerospace systems, was one of the early Six Sigma adopters. After Honeywell was merged with AlliedSignal in 1999, AlliedSignal's vice president of operations brought his Six Sigma experience from Motorola to Honeywell. The merge between these two companies reshaped the Six Sigma program, and they gave it a new name, Six Sigma Plus.

As an early adopter, Honeywell benefited from Six Sigma. Its Industrial Control team achieved a 500-percent increase in revenue growth

while cycle time was reduced 35 percent. Its Aerospace Services achieved a 43 percent reduction in components repair time. What made Honeywell determined to adopt Six Sigma earlier than others? What made it possible for Honeywell to gain such benefits while others did not conduct so? Will latecomers achieve the same performance increase? If not, what are the causes?

Case: <https://www.qualitydigest.com/dec00/html/honeywell.html>

Image: Shutterstock

heavily on their upstream network suppliers and downstream retailers who were early Six Sigma adopters? What kind of network effect can early adoption generate? Through what channels the spillover can be transferred?

Want to Know More?

When investigating administrative innovations, it is important to remember there are many different programs that may or may not include a glamorous “certificate” or “title” such Six Sigma or “Black Belt.” Many firms are able to be innovative without certifications while even creating their own proprietary processes, products, and patents. For example, the conveyor-belt like burger making process from the McDonald’s brothers initiated in the 1950’s was not based on any certification yet it was a highly innovative approach to capture “quality, service, cleanliness and value.” Lapré et al. (2000) provide a strong evidence that Total Quality Management (TQM) can provide both “know-how and know-why” links to travel faster up a learning curve. While certifications have a value-add which firms find attractive when marketing to potential customer bases, non-certifications-based process improvement cannot be underestimated nor ignored.

Benner, M.& Tushman, M. (2002) and Benner, M.& Tushman, M. (2003) analyze the administrative innovations, such as adoption of ISO 9000 and Six Sigma. These papers show how process management programs can: 1) crowd out exploratory activities and 2) should be buffered from those exploratory activities.

Foundational Classical Studies

The study builds on a couple of foundational, classical studies. First, highlighting the costliness of innovation adoptions, the authors refer to Teece (1980) which shows that administrative innovations are improvements in administrative techniques and in the organization of economic activity. Those innovations, such as Six Sigma, require major reassessments, responsibilities, resources and can therefore be expensive and disruptive to adopt.

Further, Jacobs et al. highlight the advantages which late adopters of innovations enjoy. Citing Jensen and Szulanski (2007), who found that early Six Sigma adopters guide later adopters by serving as both referents and persuader, this study discovers the reason why later adoption is favorable: the replication and application of practices for successful knowledge transfer is easier when there are more examples.

References

- Benner, M., & Tushman, M. (2002). Process management and technological innovation: A longitudinal study of the photography and paint industries. *Administrative Science Quarterly*, 47(4), 676-707.
- Benner, M., & Tushman, M. (2003). Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of Management. The Academy of Management Review*, 28(2), 238-256.
- Jensen, R.J., Szulanski, G., 2007. Template use and the effectiveness of knowledge transfer. *Management Science*. 53(11), 1716–1730.
- Lapré, M.A., A.S. Mukherjee, L.N. Van Wassenhove. 2000. Behind the learning curve: Linking learning activities to waste reduction. *Management Science* 46(5) 597-611.
- Teece, D.J., 1980. The diffusion of an administrative innovation. *Management Science*.26(5), 464–470.
- Terziowski, M, Guerrero, J. 2014. ISO 9000 quality system certification and its impact on product and process innovation performance. *International Journal of Production Economics*. 158 (12), 197-207.

BEHIND-THE-SCENES

INTERVIEW WITH PROF. BRIAN JACOBS

**How did you come up with this idea?**

Morgan Swink and I published an earlier paper in JOM – Six Sigma Adoption: Operating Performance Impacts and Contextual Drivers of Success – in 2012. We felt that more could be done with this data set, including the idea of how performance effects varied for early vs. late adoptions.

What was the biggest challenge in the research and revision?

This paper was a bit unusual in that there were few concerns about the methodology and data, primarily because we used a very similar methodology, and an expanded data set, from the 2012 paper. Instead, the major concerns were with the precision of our definitions and claims, and how we argued our hypotheses.

What are the main remaining missing puzzles in this area of research?

Our data was all at the firm-level, leaving unexplored the nuances and subtleties of specifically how Six Sigma was altered in different firms (or even within firms). Also, our focus was strictly on Six Sigma, which might not be representative of other administrative innovations.

If any, what is your subsequent, ongoing work in this area of research?

We started a project to examine the antecedents to firm-level adoption of Six Sigma but ran into data availability issues. We have not followed up further on this specific line of research.

DOES WORKING FASTER REDUCE OR INCREASE COST? BOTH CAN HAPPEN

Based on Hawk, A., & Pacheco-de-Almeida, G. (2018). Time compression (dis) economies: An empirical analysis. *Strategic Management Journal*, 39(9), 2489-2516.

Review by Seongkyoon Jeong & Chao Wu

Background

Early completion of project can lead to early accumulation of assets and generating advantages for firms, while it also incurs additional resources. As more resources are invested because of the early completion, more costs for manpower and coordination might be required. In addition, early competition will switch work processes from sequential processing to parallel processing, causing more information lost and a possibility of rework. Furthermore, to reduce task time, more alternative approaches would be tried and incur additional costs. Given these intuitive mechanisms, the trade-off between time and cost (i.e., time compression diseconomy (TCD)) has been well recognized in practice and academic studies, and it has been often used as a key assumption in analytical studies. Surprisingly, there have been very few studies on this trade-off, and most of them were small-sample based studies conducted before 1980.

Theoretically, both time compression economy and time compression diseconomy can occur. On one hand, compressing the time it takes to complete task might increase cost because doing so requires more resources as explained above. On the other hand, completing task early reduces costs required in maintaining the organizational routine (e.g., overhead cost). With these two opposing arguments, what would be the empirical nature of the relationships between time and cost?

Key Insights

The purpose of this study was to investigate the presence and determinant of TCD. Using the oil and gas industry project data that include ideal cost and time for completion as well as actual cost and time for completion, this study finds that there is rather “time compression economy”; that is, as firms shorten the duration of projects, the costs decline. These results contradict to our conventional wisdom that rushing to complete work costs more. This paper further investigates the possible explanation for the “anomaly”. One reason might be the impact of indirect cost, which could increase cost with time. Thus, the elasticity between time and cost becomes positive after a certain time point. Using the elasticity curve, this study obtains the optimal cost level, where the relationship between time and cost reverses and tested where most projects are located in the curve. Surprisingly, many projects are not “time-compressed” enough to reach the optimal cost level. These results suggest why we generally find the time compression economy: that is, most firms have a certain gap between ideal production environment and actual production execution. Another reason could be the impact of unexplained variance in the curve coefficient. That is, firms have different cost structure and thus have different elasticity curves between time and cost. As a result, estimating the time compression effect across firms may result in “time compression economy”.

Remaining Questions

As we broaden our scope from the project level to the firm level, we may find a more comprehensive effect on the firm by time-compression. Most companies run multiple projects. As a firm compresses time required for completion of a project, it may concentrate its own resources on the project. Therefore, there could be a negative spillover effect within the firm. Will other projects suffer from the lack of required resources while time compression for a project completion? What can amplify this negative spillover effect?

We may also find another effect at more micro levels. As found in many psychological studies, there could be a burn-out effect as more compressed work schedule is implied. In the short run, the time-compressed project might be conducted at a lower cost than initially expected, yet the subsequent project can suffer from the burn-out effect. This might be more impactful where employees' emotion critically influences the success of the project (e.g., the entertainment industry). What is the long-run impact of time compression? If there is, is it driven by the psychological burn-out effect?

Finally, although the paper addresses a SCM issue shortly in the discussion of the source of TCD, that issue could be studied more intensively. One can easily assume that for time compression, those who have high control over their supply chain would have better elasticity. What is the role of supply chain in TCD? And how can we find the evidence?

References

- Bendoly, E., & Chao, R. O. (2016). How excessive stage time reduction in NPD negatively impacts market value. *Production and Operations Management*, 25(5), 812-832.
- Hooper, R. (2016) The man who made 'the worst video game in history' – BBC <https://www.bbc.com/news/magazine-35560458>
- Lannelongue, G., Gonzalez-Benito, J., Gonzalez-Benito, O., & Gonzalez-Zapatero, C. (2015). Time compression diseconomies in environmental management: the effect of assimilation on environmental performance. *Journal of Environmental Management*, 147, 203-212.
- Mansfield, E., Rapoport, J., Schnee, J., Wagner, S., & Hamburger, M. (1971). *Research and Innovation in the Modern Corporation*. New York, NY: W. W. Norton & Company Inc.
- Thompson, P. (2001). How much did the liberty shipbuilders learn? New evidence for an old case study. *Journal of Political Economy*, 109(1), 103-137.
- Teece, D. J. (1977). Time-cost tradeoffs: Elasticity estimates and determinants for international technology transfer projects. *Management Science*, 23(8), 830–837

Want to Know More?

Let's change our focus to "development", where the operations focus is more on creating something new, rather than following a given routine. Can we find the same results? Bendoly and Chao (2016) shows the counter-argument: the delay provides a negative impact generated from the market reaction.

Using a similar lens toward the relationship between time and cost, we can investigate "time required for adoption". Hurried management standard adoption might lead to poor performance (Lannelongue et al, 2015), implying that time compression diseconomy might exist in different dimensions.

Think about a quality issue, which is one of the key measures in operations management. Time compression may lead to poor quality. Using the unique setting of World War II, in which the same products were produced over time, Thompson (2001) shows the evidence that reduced product time was achieved by sacrificing the quality of products and the safety of workers.

Foundational Classical Studies

Two classic studies (Mansfield, 1977; Teece, 1981) provide the basis for empirical estimation of elasticities. Despite the fact that these studies use fewer than 60 observations, the analytical derivation of elasticity allows this research to calculate elasticity using a linear estimation.



MINI CASE

ATARI AND “WORST VIDEO GAME IN THE WORLD”

When the movie E.T. became a big box office grosser, Atari bought the publication right from Steven Spielberg for more than 20 million dollars. People had high expectations of the game. Unfortunately, Atari's CEO only gave the programmers 5 weeks to make an E.T. game in order to catch the Christmas market, while normally it took 6 to 8 months to create a game at that time. No doubt that was not enough time and the game was of course disastrous. Dreadful graphics, lots of bugs...it wasn't even worth its cartridge. Customers were heavily disappointed and started to turn away from Atari. Five million E.T. cartridges were produced and less than 2 million were sold, costing Atari a huge loss – \$310 million. However, that was not the worst part of all. As a result of bad outcome of this

product, customer loyalty to Atari also dropped. In the meantime, other competitors such as Nintendo started to shine. If we consider the project management triangle, it is not hard to see that when time is compressed, Atari's game programmers had no other choices but to cut the scope of the project- resulting (according to BBC) “the worst video game in history” and the waning of Atari. In this case, the time crunch was costly for Atari, but are there other cases when the time compression is beneficial for the company? In general, how does cutting timelines affect the cost of the project?

Case: <https://www.bbc.com/news/magazine-35560458>

Image: https://upload.wikimedia.org/wikipedia/commons/e/e6/Atari_5200_-_trojandan_14871272.jpg

BEHIND-THE-SCENES

INTERVIEW WITH PROF. ASHTON HAWK

**How did you come up with this idea?**

Time compression diseconomies is a fundamental concept in core Strategy theory, and we were intrigued by asking the questions: what do we really know about TCD empirically? Does it exist in the real world? How much does it actually cost to compress time? We came to the realization that there has been decades of research in economics, operations, strategy, and marketing that had been assuming a negative and convex relationship between time and cost in R&D, project development, and capital investment, but we only have sparse and dated empirical support for that assumption with only six studies from the 60s and 70s with small sample sizes of about 5–59 observations per empirical estimate.

What was the biggest challenge in the research and revision?

We needed to econometrically account for unobserved firm and project heterogeneity

and estimate firm specific time cost curves. We employed random coefficient models to accomplish these goals.

What are the main remaining missing puzzles in this area of research?

What other industries also exhibit the same pattern of negative time-cost elasticities where firms are time-inefficient? What is the extent of these inefficiencies? Is it the case that in industries with fast clockspeed—such as fast-moving consumer goods with low standard NPD cycles—the frequency and extent of time inefficiencies should be considerably reduced? In these industries, are TCD also more salient empirically and actively constrain firms' investments?

If any, what is your subsequent, ongoing work in this area of research?

We are working on a paper on TCD in technology transfer.

INTERNAL PROCESS MANAGEMENT

Internal process management has been one of the primary interests of scholars since it primarily determines the operational efficiency of firms. Yet, there is no permanent advantage in operational efficiency. Processes for manufacturing and operations evolve over time. We have observed the rise of managerial practices for quality management (e.g., six sigma and ISO 9001). Furthermore, internal operations are no longer “behind-the-scene” in the competitive market. Today’s consumers and investors are much more sensitive to failure in services and socially responsible operations than in the past. This trend drives firms to address a number of decisions required to handle trade-offs in internal process management. In this section, we review how process management practices are adopted, how firms organize the process for new management practices and products, and how external stakeholders respond to the changes by the practices.

Topics in This Section

The Origin of Operational Strategy Formulation and Integration between Top-down and Bottom-up Operations Strategies

Based on Kim, Sting, & Loch. (2014). Top-down, bottom-up, or both? Toward an integrative perspective on operations strategy formation. *Journal of Operations Management*, 32(7-8), 462-474.

Production Management Empirical Research Manufacturing Sector

Similar but Different Effects of “Lean” and “Green” on Firm Performance

Based on Jacobs, B. W., Kraude, R., & Narayanan, S. (2016). Operational productivity, corporate social performance, financial performance, and risk in manufacturing firms. *Production and Operations Management*, 25(12), 2065-2085

Corporate Social Responsibility Empirical Research Manufacturing Sector

Does Better Service Quality Bring Higher Profitability?

Based on Mellat-Parast, M., Golmohammadi, D., McFadden, K. L., & Miller, J. W. (2015). Linking business strategy to service failures and financial performance: Empirical evidence from the US domestic airline industry. *Journal of Operations Management*, 38, 14-24.

Service Management Empirical Research Service Sector

Autonomy and Technology Turbulence: The Blood Life or Death of New Product Development Teams

Based on Chen, Neubaum, Reilly, & Lynn. (2015). The relationship between team autonomy and new product development performance under different levels of technological turbulence. *Journal of Operations Management*, 33-34(C), 83-96.

Innovation Management Behavioral Operations Empirical Research Manufacturing Sector

Stand Out by Standing First for Management Standard Implementation

Based on Su, H. C., Dhanorkar, S., & Linderman, K. (2015). A competitive advantage from the implementation timing of ISO management standards. *Journal of Operations Management*, 37, 31-44.

Corporate Social Responsibility Empirical Research Manufacturing Sector

Environmental Incidents and Performance – Reactions in China

Based on Lo, C. K., Tang, C. S., Zhou, Y., Yeung, A. C., & Fan, D. (2018). Environmental incidents and the market value of firms: An empirical investigation in the Chinese context. *Manufacturing & Service Operations Management*, 20(3), 422-439.

Corporate Social Responsibility Empirical Research Manufacturing Sector Emerging Economy

THE ORIGIN OF OPERATIONAL STRATEGY FORMULATION AND INTEGRATION BETWEEN TOP-DOWN AND BOTTOM-UP OPERATIONS STRATEGIES

Based on Kim, Sting, & Loch. (2014). Top-down, bottom-up, or both? Toward an integrative perspective on operations strategy formation. *Journal of Operations Management*, 32(7-8), 462-474.

Review by Seongkyoon Jeong and Xiangjing Chen

Background

The conventional view on the formation of an operations strategy is the macro-level view, called the top-down perspective, which previous literature extensively addresses. This perspective focuses on the formulation and implementation of operations strategy aligned with business strategy. The top-down process is led by the coordination of intentions and actions to achieve specific outcomes imposed by a central authority. Although much of the literature only focuses on the top-down formation, proponents of continuous improvement argue that the bottom-up approach also exists. This micro-level view, called the bottom-up perspective, focuses on the lower-level organizational members working in day-to-day operations, aligned with practice-based approaches (e.g., lean manufacturing and JIT). A bottom-up strategy can emerge as an unplanned pattern of actions and may realize outcomes not initially intended by top management. While both perspectives coexist, how both top-down and bottom-up approaches are formed and interact with each other are understudied.

Key Insights

This study selected six German manufacturing plants from the finalists of INSEAD's Industrial Excellence Award (IEA) competition between 2005 and 2008. After interviews and organizations charts were obtained, the authors selected plants in diverse industries of a country and performed interviews and on-site visits and ran within-case and cross-case analysis.

As a result of analysis, the following findings are obtained. Operations strategy is formed through an iterative process of integrating competitive priorities, objectives, and action plans that are partly induced by top-down planning and partly emerge from bottom-up learning. That is, the two approaches coexist, and the results from the approaches evolve with the interaction between two and other processes in the organization. Top-down action plans tend to reflect top management's strategic intentions about the organization's specified priorities. In contrast, bottom-up action plans tend to arise in the areas of operational practices and processes. This set of action plans are usually in the domain of lower-level managers' expertise. Overall, the top-down and bottom-up action plans serve complementary roles in the



MINI CASE

HOW CAN COMPANIES USE MULTIPLE APPROACHES TO ACHIEVE THEIR GOALS?

Traditionally, organizations operate with top-down management style to some extent, such as the Trump Organization. Companies in highly regulated industries, such as banks and financial industry, also tend to use top-down management. In contrast, some companies, such as The New York Times, are changing their management style and using the bottom-up operation strategy. These companies offer unique methods to let employees at all levels to make decisions by themselves.

However, top-down and bottom-up are not two mutually exclusive alternatives. Firms often obtain significant rewards for those that combine both the top-down and bottom-up approaches. This synergy has been evident in the field of energy

management. AT&T sets top-down goals for coming years and takes a bottom-up approach to establishing programs to achieve the goals. AT&T has leveraged its small-scale successes to set organization-wide goals, enabling AT&T to scale up energy efficiency.

There are still remaining questions. How should firms use different operation approaches? How should firms combine strategies to achieve multiple goals, in terms of profitability, efficiency, and energy management, etc?

Case: <https://www.edf.org/aggregator/sources/12?page=32>

Image: Shutterstock

formation of operations strategy. Additionally, the results show that decentralized organizations adopt relatively more bottom-up actions than centralized organizations do.

Remaining Questions

Since this paper analyzes how operating strategies were selected in German firms, one can suspect firms based on different countries may behave differently. In particular, cultural differences may have impacts on the choice and integrating behavior of operating strategies. For example, would East-Asian companies more tend to formulate operational strategies based on the top-down approaches? If so, what are the main drivers? And do they differently integrate top-down and bottom-up operational strategies?

In addition, the analysis was conducted in 2014. Since then, various operation strategies have emerged, empowered by the wave of big data. This trend is changing the nature of operational decisions. Advanced data-driven decisions may allow for more decentralized or centralized decision-making processes. How does this technological

change affect the balance and integration of top-down and bottom-up operational strategies?

Want to Know More?

There could be specific rationales for the firms' choice on top-down and bottom-up approaches. Mom et al. (2008) investigates how such different knowledge information flows impact manager's exploration and exploitation in activities. In addition, it would not be surprising that considering cultural aspects is one of the primary keys for successful operation strategy formulation and implementation. Using cross-country samples of plant operations, Lee Park and Paiva (2018) analyze the extent to which differences in the operations strategy process may be explained by national cultures.

Foundational Classical Studies

Two representative studies provide each top-down and bottom-up operations strategy formulation. Barnes (2002) provides the foundational work on top-down operations strategy formulation, and Kim and Arnold (1996) offer a similar framework on the bottom-up operations strategy formulation.

References

- Barnes, D. (2002). The complexities of the manufacturing strategy formation process in practice. *International Journal of Operations & Production Management*, 22(10), 1090-1111.
- Kim, J. S., & Arnold, P. (1996). Operationalizing manufacturing strategy: an exploratory study of constructs and linkage. *International Journal of Operations & Production Management*, 16(12), 45-73.
- Mom, T. J., Van Den Bosch, F. A., & Volberda, H. W. (2007). Investigating managers' exploration and exploitation activities: The influence of top-down, bottom-up, and horizontal knowledge inflows. *Journal of Management Studies*, 44(6), 910-931.
- Lee Park, C., & Paiva, E. (2018). How do national cultures impact the operations strategy process? *International Journal of Operations & Production Management*, 38(10), 1937-1963.

SIMILAR BUT DIFFERENT EFFECTS OF “LEAN” AND “GREEN” ON FIRM PERFORMANCE

Based on Jacobs, B. W., Kraude, R., & Narayanan, S. (2016). Operational productivity, corporate social performance, financial performance, and risk in manufacturing firms. *Production and Operations Management*, 25(12), 2065-2085

Review by Seongkyoon Jeong

Background

Operations management typically focuses on operational efficiency. When we consider efficiency improvement, we first think of its return in a financial term such as return on assets (ROA). However, as was observed recently in the Toyota manufacturing system, operational productivity (OP) increases risk in manufacturing. That is, overusing given resources could lead to more operational variability. Meanwhile, corporate social responsibility has arisen as one of the key managerial concerns. As in operational efficiency, corporate social performance (CSP) increases financial performance (FP) through enhanced reputation. Yet, to achieve high corporate social performance, firms have to invest a certain amount of financial resources; this activity may increase financial risk due to increased financial burden. Taken together, both operational performance and corporate social performance may improve financial performance, while inadvertently increasing firms' financial risk. Furthermore, some argue that there could be a complementary relationship between operational performance and corporate social performance. After all, since corporate social performance includes environmental management, high operational efficiency may drive better performance in environmental management—for

example, increased waste reduction. Overall, there are multiple relationships between operational productivity, corporate social performance, financial performance, and financial risk. What are the true shapes of these relationships?

Key Insights

Using sample of 476 firms in nine US manufacturing industries during the period 1999–2009 and Data Envelopment Analysis (DEA), this study measured and investigated the relationship between operational productivity, corporate social performance, financial performance, and financial risk. The findings suggest that operational performance is the key driver of good financial performance and even reduces financial risk. Yet, the results show that the main effect of corporate social performance is unclear. The authors additionally found that operational performance moderates the relationship between corporate social performance and financial performance and moderates the relationship between corporate social performance and financial risk.

Remaining Questions

While it is reasonable to discover that the overall effect of corporate social performance is mixed and distinguishable only through the contingency

**MINI CASE**

SYNERGY BETWEEN BEING “LEAN” AND “GREEN”: CANYON CREEK CABINET COMPANY

Sustainability has become a buzzword, and the enablers of sustainability in manufacturing processes have mushroomed. One stream of literature argues that lean manufacturing is one of the ways to achieve green operations (King and Lenox, 2001). A good example is Canyon Creek, which manufactures cabinets at the facility situated in Monroe, WA. In 2006, Canyon Creek cabinet company reduced lead time and material waste. Over a one-year period, the company

saved a million dollars and increased cabinet production from 900 cabinets/day to 1,000 cabinets/day. In addition, the improvement also helped generate less hazardous byproducts and lowered energy consumption.

Case: <https://news.thomasnet.com/featured/how-sustainable-practices-are-changing-the-manufacturing-sphere/>

Image: Shutterstock

driven by operational productivity, one can surmise that such a mixed effect is caused by the difference in how firms perceive and realize operational productivity and corporate social performance. While firms can intrinsically set targets for operational productivity that directly lead to the financial performance, firms can set extrinsically driven targets (e.g., institutional forces). How can we address not only the effect of operational productivity and corporate social performance but

also firms' investment decision on such targets? In addition, some argue (Ferrón Vilchez, 2017) that visible corporate social performance (e.g., such as qualitatively backed environmental impact or standard adoption) might not indicate the actual CSR level, because many firms symbolically adopt CSR activities. Could this cause the mixed results of this study? How can we address this symbolic reaction of firms in the analysis?

Want to Know More?

How does operational productivity improve corporate social performance? Some researchers find evidence from organizational learning. Russo (2009) suggests that early adoption of ISO 14001 and experience with the environmental management standards influence toxic emission levels. Similar findings are reported by recent studies with more rigorous settings (e.g., Mani and Muthulingam, 2018; Fu et al., 2018).

Many studies that focus on the relationship between CSR and financial performance use samples of developed countries. Can we find similar results in developing countries? In such countries, finances may be deemed more important since many of the population are struggling financially. Given that difference, one can doubt the consistent relationship between CSR and financial performance. Lo et al. (2016) used a sample of Chinese manufacturing firms to investigate this question and found similar findings to those in

developed countries: environmental incidents were correlated with negative stock market reactions. Meanwhile, some recent studies argue that even in the developed countries the relationship between CSR and asset price is not so clear (Paruchuri et al., 2019), while some others argue that there is a clear causal relationship between two (Flammer, 2015).

Foundational Classical Studies

“Lean and green” has been a classical topic in operations management. Previous studies (e.g., King and Lenox, 2001, Pil and Rothenberg, 2003; Rothenberg et al., 2001) believed that the relationship between lean and green manufacturing are complementary. Meanwhile, both lean manufacturing literature (e.g., Hofer et al., 2012) and green manufacturing literature (e.g., Klassen and McLaughlin, 1996) predict the positive relationship with financial performance independently, with the question regarding joint effect unanswered up until this study.

References

- Flammer, C. (2015). Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach. *Management Science*, 61(11), 2549-2568.
- King, A. A., & Lenox, M. J. (2001). Lean and green? An empirical examination of the relationship between lean production and environmental performance. *Production and Operations Management*, 10(3), 244-256.
- Durand, R., Paugam, L., & Stolowy, H. (2019). Do investors actually value sustainability indices? replication, development, and new evidence on csr visibility. *Strategic Management Journal*.
- Ferrón Vílchez, V. (2017). The dark side of ISO 14001: The symbolic environmental behavior. *European Research on Management and Business Economics*, 23(1), 33–39.
- Fu, W., Kalkanci, B., & Subramanian, R. (2018). Are hazardous substance rankings effective? An empirical investigation of information dissemination about the relative hazards of chemicals and emissions reductions. *Manufacturing & Service Operations Management*.
- Hofer, C., Eroglu, C., & Hofer, A. R. (2012). The effect of lean production on financial performance: The mediating role of inventory leanness. *International Journal of Production Economics*, 138(2), 242-253.
- Klassen, R. D., & McLaughlin, C. P. (1996). The impact of environmental management on firm performance. *Management Science*, 42(8), 1199-1214.
- Lo, C. K., Tang, C. S., Zhou, Y., Yeung, A. C., & Fan, D. (2018). Environmental incidents and the market value of firms: An empirical investigation in the Chinese context. *Manufacturing & Service Operations Management*.
- Mani, V., & Muthulingam, S. (2018). Does learning from inspections affect environmental performance? Evidence from unconventional well development in Pennsylvania. *Manufacturing & Service Operations Management*.
- Pil, F. K., & Rothenberg, S. (2003). Environmental performance as a driver of superior quality. *Production and Operations Management*, 12(3), 404-415.
- Rothenberg, S., Pil, F. K., & Maxwell, J. (2001). Lean, green, and the quest for superior environmental performance. *Production and Operations Management*, 10(3), 228-243.
- Russo, M. V. (2009). Explaining the impact of ISO 14001 on emission performance: A dynamic capabilities perspective on process and learning. *Business Strategy and the Environment*, 18(5), 307–319.

BEHIND-THE-SCENES

INTERVIEW WITH PROF. BRIAN JACOBS

**How did you come up with this idea?**

We were all interested in the relationship between corporate social responsibility and productivity, and we had completed other projects in this research stream. The specific motivation for this paper was the 2011 paper by Magali Delmas and Chien-Ming Chen (*Measuring Corporate Social Performance: An Efficiency Perspective*, POM). In that paper, they create a measure of CSP using ordinal DEA of KLD rankings. Our thought was to use their measure for CSP to see if we could demonstrate and quantify its relationship to productivity.

What was the biggest challenge in the research and revision?

The review team expressed concerns with contribution as well our data and econometrics. The paper was initially focused on the relationship between CSP and financial performance, but this is a crowded space with lots of good papers already published. We expanded our

contribution but also looking at risk in addition to financial performance. This required substantial rewrite and added analyses.

What are the main remaining missing puzzles in this area of research?

Measuring CSP is not easy, or consistently done. We added a “twist” to the use of KLD data by employing Chen & Delmas’ ordinal DEA metric. But consistent and well-accepted measurement of CSP remains elusive.

If any, what is your subsequent, ongoing work in this area of research?

We have no plans to build directly upon this paper, but we each continue to work in the sustainability space (as broadly defined). For example, I’m involved with two different projects looking at the relationship between water consumption and firm profitability in the consumer packaged goods industry.

DOES BETTER SERVICE QUALITY BRING HIGHER PROFITABILITY?

Based on Mellat-Parast, M., Golmohammadi, D., McFadden, K. L., & Miller, J. W. (2015). Linking business strategy to service failures and financial performance: Empirical evidence from the US domestic airline industry. *Journal of Operations Management*, 38, 14-24.

Review by Xiangjing Chen and Chao Wu

Background

Does better service quality always bring higher profitability? Service quality has been a key decision dimension in the business model, especially because today's economy is transitioning into the service era. Given that service quality is realized at the cost of the improvement, a good understanding of the trade-off on service quality and profitability is necessary. There are two schools of thoughts. Some argues that service quality has a positive linear relationship with profitability. Others claim that the marginal effect of service quality on revenue diminishes, while the marginal cost of service quality improvement increases. What is the true nature of the relationship between service quality and profitability?

Key Insights

This study demonstrates the different relationships between different service failures (i.e., arrival delays, mishandled baggage, involuntary denied boarding, and customer complaints) and financial performance in the U.S. domestic airline industry. Service failures are measured by arrival delays, mishandled baggage and involuntary denied boarding. Airline profitability is defined as ratio of operating profit over operating revenue.

The purpose of this study is to test following hypotheses: a) the relationship between arrival

delays and profitability is more concave for non-focused airlines than focused airlines; b) the relationship between mishandled baggage and profitability will have a significantly steeper negative slope for focused airlines than non-focused airlines; c) the relationship between involuntary denied boarding and profitability will have a significantly steeper negative slope for focused airlines than non-focused airlines; and d) the relationship between customer complaints and profitability will have a significantly steeper negative slope for focused airlines than non-focused airlines. To test these hypotheses, the authors build 6 mixed-effects models using longitudinal data of operations of airliners, and they find that the hypotheses 1, 2, and 4 are fully or partially supported by the models, but the hypothesis 3 is not supported significantly.

The study suggests that 1) service failure targets should be decided upon competitive strategy, 2) airline firms should keep customers more informed regarding the status of arrivals and departures, and 3) firms should develop more formal service recovery procedures. In addition, operations manager should develop a better understanding on how to improve airline rerouting flexibility to recover from service failures. Manager should also be aware that service failures do not homogeneously affect firms in the industry and that there is a tradeoff on the cost of quality and revenue increase.



MINI CASE

A DIFFERENT LOOK AT VALUE OF SERVICE

The airline industry has overbooked customers for many years to achieve higher profitability, and this approach often results in customers get involuntarily bumped out of flights. This practice damages airline service quality and the reputation of the airline operator. Although it would take a longer waiting period for the customers, customers still get the service delivered. If we consider the same logic in other industries, it is not hard for us to observe similar patterns. Tesla customers are waiting for a few years to get their products delivered. Luxury products might have an even longer waiting period. Hermes would reject some customers and keep them on a waiting list if their top tier products did not meet quality standard. High end restaurants would require customers to pay non-refundable deposit for reservation. All these

practices are designed to ensure product quality, brand image, and profitability, and customers are usually willing to endure this waiting time for their expected products and services. However, customers may have to face a tradeoff between quality of service/product and complimentary service. In case of the airline industry, it seems that availability of transportation service is more important for many customers and that they are willing to trade occasional delay with lower cost of airfare. Some other customers may prefer a comfortable flight experience with on time arrival to other alternatives.

Case: <https://nypost.com/2018/07/01/how-hermes-rejects-are-bagging-purses-despite-snooty-shops/>

Image: Shutterstock

Remaining Questions

Since airline service failure is almost inevitable, a practical approach that operations manager would take is to reduce its impact. In that regard, one can raise questions as to what the right way to keep customers informed is and how different approaches would affect customer satisfactions. A general trend in the airline industry is to form an alliance with other airliners to fill in the route gaps among themselves and avoid unnecessary competition. However, this may create congestion and increase the possibility of arrival delays. Then, what is an efficient collaboration form for airliners? Should it be simply the traditional way (e.g., avoiding overlapping routes)? Furthermore, in the light of customers' different tolerance level of service failure, airline firms can introduce different services to targeted customer groups. For example, students may care more about cost and are flexible on schedule, business professionals care more about the on-time rate (percentage of flights that arrive on-time). In addition to service quality, physical quality and/or perceptual quality may also affect the firm's financial performance.

Want to Know More?

References

- "Top Airline Customer Complaints." SKYTRAX. (2015). www.airlinequality.com/news/airline-customer-complaints/.
- Lee et al. (2017) Why can some service employees provide service of a consistently high quality while others cannot? *Service Science*, 9(2), 167-180.
- J.L. Heskett, W.E. Sasser, L.A. Schlesinger. (1997). *Service Profit Chain*. Simon and Schuster Inc., New York, NY.
- Lambert, R. A. (1998). Customer satisfaction and future financial performance discussion of are nonfinancial measures leading indicators of financial performance? An analysis of customer satisfaction. *Journal of Accounting Research*, 36, 37.
- Steven, A. B., Dong, Y., & Dresner, M. (2012). Linkages between customer service, customer satisfaction and performance in the airline industry: Investigation of nonlinearities and moderating effects. *Transportation Research Part E: Logistics and Transportation Review*, 48(4), 743–754.
- R.H. Ballou. (1999). *Business Logistics Management* (fourth ed.), Prentice Hall, Upper Saddle River, NJ
- Dresner, M. (1995). Customer service, customer satisfaction and corporate performance in the service sector. *Journal of Business Logistics*, 16(1), pp.23-40.

According to SkyTrax (2015), Top 5 airline customer complaints are lost baggage, delayed flight, aircraft seats, hidden costs, and customer service. Regarding how to improve service quality, Lee et al. (2017) find that job tenure is negatively related to variation of service quality.

Foundational Classical Studies

The theoretical foundations are based on a few literature streams. Heskett, Sasser, and Schlesinger (1997) develop the "service profit chain" theory that states there is a positive linear relationship between service quality and financial performance. However, Mellat-Parast et al (2015) do not fully agree with this theory and cite Lambert (1998), Steven, Dong, and Dresner (2012), Ballou (1999), and Dresner and Xu (1995) which call into question the view that service quality has a positive linear relationship with financial performance. These studies argue that the marginal effect of service quality on revenue will diminish as service quality improves and that the marginal cost of improving service quality tends to increase once a firm achieves a high level of service quality.

AUTONOMY AND TECHNOLOGY TURBULENCE: THE BLOOD LIFE OR DEATH OF NEW PRODUCT DEVELOPMENT TEAMS

Based on Chen, Neubaum, Reilly, & Lynn. (2015). The relationship between team autonomy and new product development performance under different levels of technological turbulence. *Journal of Operations Management*, 33-34(C), 83-96.

Review by Xiangjing Chen and Marc Ryan Hatton

Background

It is frequently suggested in operations management studies that autonomy can motivate teams to perform better and more quickly adapt to new environments, hence improving creative problem solving which is important for new product development. However, empirical studies have not provided consistent support for this point of view. Many new product development teams operate under highly autonomous environments: no Senior VP looking over their shoulder and micromanaging them. Furthermore, new product development teams maintain elite levels of creativity which drive their passion for problem solving in high (and low) technology turbulent environments. Although creativity may still flourish in both environments, how do these environments affect the new product development performance?

Key Insights

This paper examines the moderating effects of technological turbulence on autonomous-team performance relationships and the relationship between operational outcomes and the success of the product being commercialized and launched.

Previously, team autonomy was viewed as a major facilitator, however, Chen et al. (2015) posit that team autonomy is a “bi-polar factor” depending on its relative level, acting as both a constrainer and a facilitator. This paper uses two key aspects for operational outcomes: development speed (how quickly an idea moves from concept to product in the marketplace) and development costs (how well a product development team adheres to its developmental budget). Technology turbulence is defined as the rate and unpredictability of change associated with technology used to develop new products in an industry. The findings show that the greater the technological turbulent environment, the more semi-autonomous teams provide effective operational outcomes. Conversely, in lesser technological turbulent environments, highly autonomous new product development teams provide more effective operational outcomes. Managers should take note that a one-size-fits-all approach may not be applicable as different companies maintain different management styles.

Remaining Questions

This paper thoroughly analyzes new product development teams of successfully released



MINI CASE

HUGO BOSS: WHERE YOU CREATE YOUR OWN JOB

"This is not just a job but basically a canvas for you to create your own Hugo Boss in whatever function." This is the operation strategy Hugo Boss sees employees. The company gives individuals and teams the budgets and autonomy to develop new ideas with agility and efficiency. By allowing high team autonomy, Hugo Boss is able to roll out new designing concept and samples in less than 1 year. Admittedly, not all team autonomy initiatives can be successful in the end, but the chief executive, Mark Langer, believes that they

have to become comfortable with failure and overall team autonomy is a good strategy for Hugo Boss new product development. Although, Hugo Boss is comfortable with this failure, how does the environmental turbulence affect their success? Would less autonomous teams be more successful in a different environment?

Case: <https://www.businessoffashion.com/articles/careers/building-an-agile-business-at-hugo-boss>

Image: Shutterstock

projects. While learning from past successes is very helpful, there is a wealth of knowledge found in failures as well. As such, what quantifiable data on failed projects could assist this study? While also analyzing this phenomenon (technology turbulence moderating team autonomy of new product development teams) in large companies, there may be vital data captured in other size firms, specifically smaller companies. In fact, not just small companies but even startup companies, does technology turbulence moderate team autonomy for startup firms? Or does it mediate? Or maybe there is no relationship at all with startup companies due to being already flat in nature and possessing high levels of elite creativity?

Want to Know More?

There are a number of factors involved which cause the “bi-polar” relationship between technological turbulence and team autonomy that could use some research. For instance, Galbraith (1973) states that different levels of technological turbulence in a new product development project are associated with

different information processing requirements. Also, Bendoly et al (2006) explains that team autonomy has both behavioral and non-behavioral effects on operational outcomes. Furthermore, Patanakul et al (2012) explore under which circumstances an autonomous team is the best choice for new product development. And finally, Pratono and Arshad (2018) analyze the impact of technological turbulence on the relationship between autonomy, pricing capability, and firm performance.

Foundational Classical Studies

The authors use a couple of classical foundational studies to bridge support for their hypotheses. Namely, they cite Patanakul et al (2012) who found that team autonomy can motivate teams to adapt to fast-changing environments with a linear relationship. Additionally, the authors refer to Tatikonda and Montoya-Weiss (2001) who found that technological uncertainty moderates the relationship between organizational process factors (like project management autonomy) and operational outcomes.

References

- Chen, Neubaum, Reilly, & Lynn. (2015). The relationship between team autonomy and new product development performance under different levels of technological turbulence. *Journal of Operations Management*, 33-34(C), 83-96.
- Pratono, A., Ratih, H., & Arshad, R. (2018). Does entrepreneurial autonomy foster SME growth under technological turbulence? The empirical evidence from Indonesia. *Journal of Technology in Behavioral Science*, 3(3), 170-178.
- Bendoly, E., Donohue, K. and Schultz, K. (2006). Behavior in operations management: Assessing recent findings and revisiting old assumptions. *Journal of Operations Management*, 24(6), pp.737-752.
- Patanakul, P., Chen, J., & Lynn, G. (2012). Autonomous teams and new product development. *Journal of Product Innovation Management*, 29(5), 734-750.
- Galbraith, J.R., 1973. *Designing Complex Organizations*. Addison-Wesley, Boston, MA.
- Tatikonda, M. and Montoya-Weiss, M. (2001). Integrating operations and marketing perspectives of product innovation: The influence of organizational process factors and capabilities on development performance. *Management Science*, 47(1), pp.151-172.
- Maier, S. (2016). Five companies getting employee engagement right. *Entrepreneur*, [online] (28). Available at: <http://www.entrepreneur.com/article/285052> [Accessed 19 Aug. 2019].



BEHIND-THE-SCENES

INTERVIEW WITH PROF. JIYAO CHEN

How did you come up with this idea?

The conflicting theoretical arguments and empirical findings on the effect of team autonomy on team performance inspired me to reconcile them. On one hand, team autonomy is argued to motivate teams to actively and flexibly adapt to fast-changing environments, which in turn can lead to better team performance. On the other hand, the high degree of team autonomy is expected to lead to the risks of isolation and the loss of managerial control. The empirical findings have been also inconsistent and contradictory. While some studies confirmed the moderating effect of technological novelty, others did not.

What was the biggest challenge in the research and revision?

The biggest challenge in this project was how to develop a theoretically-driven explanation for these inconsistencies in autonomy research. Particularly, I propose there are two mechanisms – behavioral and mechanistic – on the main effects of team autonomy on team performance and there is a need to argue how the two mechanisms are moderated by technological turbulence as an essential contextual variable from the information processing perspective. By integrating the two mechanisms under different circumstances, we need to discuss how the relationship changes from an inverted U to a U-shaped function as technological turbulence decreases.

What are the main remaining missing puzzles in this area of research?

Our data indicates that a high control approach can be effective in a technologically stable environment, this approach may have negative long-term repercussions as teams may feel indifferent. Low employee morale and the failure to develop employees are two potential costs to a long-term directive approach. As our study indicates, the balance between autonomy and control is a delicate one that needs further exploration. Finally, we assume all NPD teams have bounded rationality under high technological turbulence, however, this assumption may not be true for highly skilled teams. A promising avenue for future research is to test the moderating effect of team capabilities or skills on the effect of team autonomy.

If any, what is your subsequent, ongoing work in this area of research?

Currently, by moving the level of analysis from team to firm, I am investigating how structural attributes of a firm's inventor network influences the firm's absorptive capacity and innovative performance. Particularly, I am interested in the effect of cluster coefficients of a firm's inventor network, in which I hope to produce some insight on the relationship between autonomy and control. I assume if many teams within a firm are autonomous, the clustering coefficient of its inventor network should be high.

STAND OUT BY STANDING FIRST FOR MANAGEMENT STANDARD IMPLEMENTATION

Based on Su, H. C., Dhanorkar, S., & Linderman, K. (2015). A competitive advantage from the implementation timing of ISO management standards. *Journal of Operations Management*, 37, 31-44.

Review by Seongkyoon Jeong and M. Ryan Hatton

Background

Given that competitive advantages are realized as firms secure resources that other firms may not have, the competitive effects of management standards (e.g., ISO 14001 and ISO 9001), which are widely adopted in the business world and change internal processes of firms to be alike, have been called into question. Assuming that there could be no significant effect of management standards on the competitiveness of firms, some scholars even argue that firms implement management standards rather because they primarily intend to mimic other firms' initiatives associated with management standards. In fact, previous studies show mixed results on the relationship between the adoption of management standards and performance. Do firms benefit from the implementations of management standards? Where can we find the evidence and what are the mechanisms?

Key Insights

The authors argue that early adopters have advantages over others who adopt management standards late. Because early commitment to newly perceived important management problem (e.g., sustainability) makes firms stand out more and are competitive in process management, the early timing of ISO adoption translates into higher

performance. Two moderators amplify the impact: absorptive capacity and competitive nature. Absorptive capacity increases the efficiency in the use of management standards, and competition intensity makes it more difficult for rivals to monitor what other firms do, enlarging the effect of the early mover advantage.

Remaining Questions

The linkage between competition and the early mover advantage might be more nuanced. It is possible that the mimicking and monitoring behavior in the intensive competition are more commonly observed, as firms face more strategic pressure from the competition. The question as to why competition enhances the early mover advantage is still an interesting topic that can be addressed with additional theoretical analysis.

From an empirical perspective, there are interesting opportunities for further research as well. 1) Additional insights might be gained by using plant level data and performance measures; 2) Objective measurement of rivals performance can enhance the comparisons of firms to provide a more detailed picture of early mover advantage; and 3) Counter-factual analysis (using quasi-experimental approach) can be useful to measure more precise impact, especially to handle the slow growth rate in



MINI CASE

FORD MOTOR COMPANY BECOMES FIRST US AUTOMAKER FOR ISO 14001 STANDARD

In 1998, Ford Motor Company required its manufacturing facilities, worldwide, to certify to the ISO 14001 international standard. This certification requires all Ford facilities to maintain a policy to address prevention of pollution and compliance with all relevant laws and regulations. Back in April 2001, when the original article was published, there was talk that Ford had “saved millions of dollars” with this initiative. Extant literature was not discovered to refute or support this claim, however, as of April 2018, Ford Motor Company has realized quite significant savings in various areas of their manufacturing facilities. Among the many savings, some of the most notable items were reducing the following: global operational energy use by 30 percent, CO₂ emissions from facilities by 39 percent, and water use by 43 percent. These main reductions led to improved energy efficiency, 4.5% in the U.S., which resulted in savings of about \$18 million. Along with savings come many “first time” accolades

that support their bold move nearly twenty years ago to make this worldwide facility certification: first automaker to estimate its total greenhouse gas emissions from its facilities; first automaker to participate in carbon trading markets in North America and the United Kingdom; and first Automaker to certify all its manufacturing plants worldwide under ISO 14001.

With the effect of ISO 14001 adoption showing strong benefits for Ford Motor Company, why didn’t other firms adopt it as early as Ford? What if Ford had adopted ISO 14001 late? Did the early adoption result in the good outcome for Ford?”

Case: http://www.csrwire.com/press_releases/25706--Ford-ISO-14001-Provides-Roadmap-to-Environmental-Savings

<https://www.reliableplant.com/Read/11570/ford-reduces-manufacturing-impact-on-environment>.

Image: Shutterstock

the latter stage of business life than that of the early stage. This removes the possibility that there exists a simple correlation between growth rate and time trend, which can result in spurious results.

Want to Know More?

Is there really a synergy effect between ISO 14001 and ISO 9001? Similar to this study, Ferron Vilchez and Darnall (2016) attempt to address the presence of complementarity between the two management standards and finds support for the idea of complementarity. It has been nearly two decades since ISO 14001 was first established. There have been many studies using this standard, and it is time to summarize what has been found. Boiral et al. (2017) extensively review previous studies on ISO 14001 and found that the positive environmental impact of ISO 14001 is quite evident. Management standards may provide early adopters with certain benefits. Conversely,

would firms adopt ISO 14001 for the benefits? We cannot fully ignore the isomorphic behavior of firms in adopting management standards. Ferron Vilchez (2017) provides some evidence of symbolic adoption of ISO 14001 in the industry.

Foundational Classical Studies

As management standards arose as key management practices early in 2000s, several pioneering studies attempted to investigate the effect of management standards on performance, on which this paper is founded. Representatively, Corbett and Klassen (2006) began to discuss why ISO 14001 improves management performance in early 2000s. In addition, this study centers on how absorptive capacity helps to explain why the advantage of implementing management standards differs across firms. Cohen and Levinthal (1990) provides the foundational understanding of absorptive capacity.

References

- Boiral, O., Guillaumie, L., Heras-Saizarbitoria, I., & Tayo Tene, C. V. (2017). Adoption and outcomes of ISO 14001: A systematic review. *International Journal of Management Reviews*, 0, 1–22.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128-152.
- Corbett, C. J., & Klassen, R. D. (2006). Extending the horizons: Environmental excellence as key to improving operations. *Manufacturing & Service Operations Management*, 8(1), 5–22.
- Ferrón Vilchez, V. (2017). The dark side of ISO 14001: The symbolic environmental behavior. *European Research on Management and Business Economics*, 23(1), 33–39.
- Ferron Vilchez, V., & Darnall, N. (2016). Two are better than one: The link between management systems and business performance. *Business Strategy and the Environment*, 25(4), 221-240.

ENVIRONMENTAL INCIDENTS AND PERFORMANCE – REACTIONS IN CHINA

Based on Lo, C. K., Tang, C. S., Zhou, Y., Yeung, A. C., & Fan, D. (2018). Environmental incidents and the market value of firms: An empirical investigation in the Chinese context. *Manufacturing & Service Operations Management*, 20(3), 422-439.

Review by Chao Wu and Seth Washispack

Background

Rapid economic development has led to severe environmental problems in developing countries such as India and China. For example, since 2013, the smog in China has caused serious health problems for citizens. Although, multiple studies have demonstrated a positive impact of environmental initiatives on financial performance, few studies have considered whether the same effect holds in developing countries. Do investors in developing countries pay the same attention to Corporate Social Responsibility (CSR) such as environmental incidents? Will demographic differences (e.g., government ownership, political ties) affect investors' opinion towards these incidents? How do these incidents affect these Chinese companies' global customers?

Key Insights

The authors found similar results in China as for developed countries: environmental incidents have a negative effect on firm market value. This suggests that investors believe CSR as an important corporate strategy for Chinese firms. Firms that are known for social responsibility and that have a higher share of government ownership are less affected by environmental incidents. On the other hand, firms with personal political ties in top management are punished more harshly for environmental incidents. Additionally, the market

value of oversea customers (buyers) of these Chinese firms (suppliers) are negatively impacted by the environmental incidents, suggesting that overseas buyers should be concerned about the environmental practices of their Chinese suppliers.

Remaining Questions

This study found that a firm's market value decreases in the short-term, but does it simply rebound? In other words, do environmental incidents have only short-term impacts? If so, how long does will take to rebound? It is also important to realize that these are negative events. How do positive environmental management events affect firms in developing countries? Klassen and McLaughlin (1996) and Jacobs et al. (2010) revealed a positive impact in the developed countries. As in firms in developed countries, do firms in developing countries that are known for proactively tackling environmental issues outperform their counterparts? In other words, poor environmental performance negatively impacts Chinese firms. Does abnormally good environmental performance positively impact Chinese firms?

CSR consists of not only environment management but also management regarding social issues such as equality and social welfare (e.g., the triple bottom line of "people, planet, and profit"). How does the social performance of Chinese firms affect their performance? Does poor social performance affect



MINI CASE

CHINESE COMPANIES FAIL TO MEET AIR POLLUTION STANDARDS

The pollution crisis in China is becoming worse at times becoming so severe that the government has cancelled school and advised people to stay inside. Northern China has the biggest problems; some cities in this region have the worst air pollution in the world. To combat these issues, China has enacted more stringent environmental standards, but many companies are not meeting these standards. In 2017, northern Chinese environmental investigators found nearly 14,000 companies, 70% of the companies they investigated, failed to meet the air pollution environmental standards.

In the US many companies have been persuaded to act more environmentally friendly because of the pressure of customers and investors. Are these failures to meet these environmental standards a sign that investors in China do not respond to environmental violations? Many Chinese companies are suppliers for overseas buyers. Will these violations hurt overseas companies who are buyers from these companies?

Case: <https://www.nytimes.com/2017/06/13/world/asia/china-companies-air-pollution-paris-agreement.html>

Image: https://commons.wikimedia.org/wiki/File:Factory_in_China.jpg

Chinese firms in the same way? What about positive social performance?

Want to Know More?

As demonstrated in this study, environmental incidents by suppliers negatively affect buying companies. To protect themselves, buying companies need to actively improve their suppliers' compliance with environmental and social issues. Recent qualitative research (Villena and Gioia, 2018) reveals that the current practices buyers are using to improve compliance to sustainable supply chain standards do not work well. In addition, Villena (2018) suggests that one of the barriers to spread CSR initiatives further upstream is to have the buyer's procurement unit directly engage the supplier's procurement unit. In the same research focus, Porteous et al. (2015) suggest an effective incentive system: they consider how buying companies can effectively induce compliance by their suppliers (and reduce operating costs). They find that certain penalties and incentives improve supplier compliance; specifically, they find

incentives of increased business and training are strongly associated with compliance.

A previous study considered the link between CSR and firm performance in developing countries using publicly listed firms in Malaysia (Saleh and Muhamad, 2011). The authors used three different measures of firm performance (ROA, ROI, and Q ratio) and found a positive relationship between CSR and firm performance in the short-term, but they provided limited evidence for a long-term impact.

Foundational Classical Studies

The effect of environmental issues on business performance has been investigated for decades. The authors use both one of the earlier and seminal studies on this link (Klassen and McLaughlin, 1996) and a more recently study (Jacobs et al., 2010) to ground themselves in the CSR literature. Another seminal article (Zucker, 1997) helped the authors support some of their investigations into the Chinese contextual factors (e.g. recognition of social responsibility).

References

- Jacobs, B. W., Singhal, V. R., & Subramanian, R. (2010). An empirical investigation of environmental performance and the market value of the firm. *Journal of Operations Management*, 28(5), 430-441.
- Klassen, R. D., & McLaughlin, C. P. (1996). The impact of environmental management on firm performance. *Management Science*, 42(8), 1199-1214.
- Porteous, A. H., Rammohan, S. V., & Lee, H. L. (2015). Carrots or sticks? Improving social and environmental compliance at suppliers through incentives and penalties. *Production and Operations Management*, 24(9), 1402-1413.
- Saleh, M., Zulkifli, N., & Muhamad, R. (2011). Looking for evidence of the relationship between corporate social responsibility and corporate financial performance in an emerging market. *Asia-Pacific Journal of Business Administration*, 3(2), 165-190.
- Villena, V. H. (2018). The missing link? The strategic role of procurement in building sustainable supply networks. *Production and Operations Management*, 28(5), 1149-1172.
- Villena, V. H., & Gioia, D. A. (2018). On the riskiness of lower-tier suppliers: Managing sustainability in supply networks. *Journal of Operations Management*, 64(1), 65-87.
- Zucker, L. G. (1977). The role of institutionalization in cultural persistence. *American Sociological Review*, 42(5), 726.

BEHIND-THE-SCENES

INTERVIEW WITH PROF. KWAN (CHRIS) LO

How did you come up with this idea?

My co-author introduced the China's environmental violations database to the research team, and we develop the idea together. We all believe that linking the supplier's environmental performance to downstream customers financial performance was an empirical puzzle that was worth more attention. Most previous studies on firm environmental-financial performance are at the firm-level analysis. We wanted to break through that hurdle in our research design. In addition, the political tie, government shares, and social awards variables are unique contexts in China's firm's reputation and compliance, and we believe that it is exciting to operations management researchers.

What was the biggest challenge in the research and revision?

The biggest challenge for the research was to verify the data accuracy. Although the database consolidates all violations announcement in China from multiple sources and it provides

the dates of violation announcement, we found that the date might not be the earliest date to the stock market. We found this out during the revision, and thus we revisited every single sample's announcement date by searching the original announcement, which took a tremendous effort.

What are the main remaining missing puzzles in this area of research?

The main missing puzzle is still how suppliers' performance affect downstream supply chain partner performance, as our current study did not study the moderating factors in this relationship.

If any, what is your subsequent, ongoing work in this area of research?

We are working on the long-term financial performance effects of environmental violations in China (in contrast to the short-term stock price abnormal return in this study).



INTEGRATION AND INTER- ORGANIZATIONAL INTERFACE

Firms have pushed for operational integration not only from an internal perspective but externally as well. While this push for integration can provide business advantages, there are trade-offs and levers observed throughout the process. Many organizations look for integrations for increased information access. Others use network relationships and power postulates as business drivers which facilitate a stronger market position for some organizations but not all. In this section, we review insights of integration amongst a variety of industries- including government- along with the observed trade-offs and levers of profitability and productivity which each organization is faced with.

Topics in This Section

In-Store, Online, or Both? New Product Quality Decisions

Based on Luo, L., & Sun, J. (2016). New product design under channel acceptance: brick-and-mortar, online-exclusive, or brick-and-click. *Production and Operations Management*, 25(12), 2014-2034.

Production Management Analytical Research Retail Sector

Sharing Information with Farmers – How Will They Respond?

Based on Liao, C. N., & Chen, Y. J. (2017). Farmers' information management in developing countries—A highly asymmetric information structure. *Production and Operations Management*, 26(6), 1207-1220.

Corporate Social Responsibility Analytical Research Non-Profit Organization

How to Translate Integration into Higher Productivity

Based on Natividad, G. (2014). Integration and productivity: Satellite-tracked evidence. *Management Science*, 60(7), 1698–1718.

Production Management Empirical Research Service Sector

1+1>2? The Impact of Social Media Integration

Based on Zhuoxin Li, Ashish Agarwal (2017) Platform integration and demand spillovers in complementary markets: Evidence from Facebook's integration of Instagram. *Management Science* 63(10):3438-3458.

Innovation Management Technology Management Empirical Research Emerging Economy

Government Stance – You're Interfering with Our Operations

Based on Dube, Van Der Vaart, Teunter, & Van Wassenhove. (2016). Host government impact on the logistics performance of international humanitarian organisations. *Journal of Operations Management*, 47-48, 44-57.

Humanitarian Operations Empirical Research Non-Profit Organization

IN-STORE, ONLINE, OR BOTH? NEW PRODUCT QUALITY DECISIONS

Based on Luo, L., & Sun, J. (2016). New product design under channel acceptance: Brick-and-mortar, online-exclusive, or brick-and-click. *Production and Operations Management*, 25(12), 2014-2034.

Review by Xiangjing Chen and Seth Washispack

Background

In the past decade, traditional brick-and-mortar stores have created online storefronts. This gives the retailer options for new product placement; they can choose to offer products online only, in-store only, or through both channels (brick-and-click). Although the manufacturer presents new products to the retailers, the retailer ultimately decides how to offer the product. Because product offering by a retailer can affect the manufacturer's profitability, the manufacturer may want to influence the retailer's decision. Since the beginning of retailer's move into online, manufacturers have used product quality to influence the retailers, but what product quality changes will induce a retailer to offer a product in both channels (brick-and-click)?

Key Insights

The authors develop a game-theoretic model to determine the optimal manufacturing strategy to induce retailer dual-channel (brick-and-click) acceptance. There are two main tradeoffs for the manufacturer that the model considers: opportunity cost of new products not accepted by the retailer and profit margin differences for online vs. in-store products. Because in-store displays have limited space, the product characteristics may be stricter for in-store placement. The model produces two main findings: 1) if the online storefront is less appealing for the retailer (e.g., products needing physical examination by the customer

such as appeal and accessories), the manufacturer lowers the quality of the new product, hence reducing the price, to induce the retailer make the product available in both channels; 2) if the online storefront is appealing for the retailer (e.g., touch-and-feel are less important such as appliances and electronics), the manufacturer enhances the quality of the new product. Even though the article focuses on manufacturing strategy, retailers can potentially improve their profit by adjusting product characteristic requirements, so the dual-sourcing option is the most attractive for the manufacturer.

Remaining Questions

As is true for all models, some assumptions must be made. This game-theoretic model assumes there is only one manufacturer. In reality, there are multiple manufacturers who are competing with one another for retailer product acceptance. How would the implications change when competition is considered? Must the manufacturer consider the quality of her competition?

Although product quality is an important consideration for a retailer's distribution decision, there are other factors that affect this decision. What factors, such as price, flexibility, suppliers' and manufacturers' power, and delivery time, are most salient for a retailer's distribution decision? Should manufacturer's consider product quality first when trying to influence retailer's distribution decision?



MINI CASE

MAGNOGRIP: INFLUENCING HOME DEPOT TO SELL IN STORES

A Stanford graduate student started MagnoGrip in 2005 to help handy men and women. Using magnets, MagnoGrip's product allow its users to secure tools and hardware. For example, the MagnoGrip magnetic wristband can hold screw or nails for easy access while working. In 2009, the MagnoGrip received its first big box contract from Home Depot. The agreement included online only distribution, but MagnoGrip eventually wanted distribution in Home Depot's stores as well. The founder eventually also

wanted to sell his product in Home Depot physical stores. What type of product changes should MagnoGrip pursue to influence Home Depot? Will product quality improvements induce in-store placement by Home Depot and still be profitable?

Case: <http://files.magnogrip.com/file/SF-Business-Times-MagnoGrip.pdf>

Image: <https://www.flickr.com/photos/wicker-furniture/8960459571/>

Want to Know More?

The authors explain their model has implications for retailers to improve their profit. Although most retailers now have an online storefront, this strategy may not be profitable. As demonstrated by Ofek et al. (2011) and Jing (2018), including an online storefront to traditional brick-and-mortar business can change strategies for pricing and in-store service in some cases, causing the online storefront to decrease the retailer's profit.

Many brick-and-mortar stores are moving into the online space because of the unlimited "shelf-space" and inventory location flexibility. On the other hand, many online-only retailers, such as Warby Parker, have chosen to create hybrid storefronts called showrooms. These showrooms provide advantages similar to what an online storefront could provide and what an offline store could provide (e.g., customers enabled to touch and feel the products). To understand whether showrooms

are a profitable venture, Bell et al. (2017) used quasi-experiment data to investigate this. They demonstrated showrooms provide both demand and operational benefits and found that showrooms can be a profitable venture for online-only retailers.

Foundational Classical Studies

To provide support for the idea that manufacturers can influence retailer's decision, the authors lean on Jeuland and Shugan (1983) and Iyer (1998) who demonstrated how manufacturers can induce a retailer to offer the level of service and price desired by the manufacturer through the use of menu-based contracts. "Menu-based contracts induce differentiated retailer behavior despite the fact that the retailers are not 'forced' into accepting different terms of trade." Additionally, the authors considered how retailers respond to a manufacturer's trade deals based on Tyagi (1999).

References

- Bell, D. R., Gallino, S., & Moreno, A. (2017). Offline showrooms in omnichannel retail: Demand and operational benefits. *Management Science*, 64(4), 1629-1651.
- Iyer, G. (1998). Coordinating channels under price and nonprice competition. *Marketing Science*, 17(4), 338-355.
- Jeuland, A. P., & Shugan, S. M. (1983). Managing channel profits. *Marketing Science*, 2(3), 239-272.
- Ofek, E., Katona, Z., & Sarvary, M. (2011). "Bricks and clicks": The impact of product returns on the strategies of multichannel retailers. *Marketing Science*, 30(1), 42-60.
- Tyagi, R. K. (1999). A characterization of retailer response to manufacturer trade deals. *Journal of Marketing Research*, 510-516.
- Jing, Bing. (2018). Showrooming and webrooming: Information externalities between online and offline sellers. *Marketing Science*. 37(3), 469-483.

BEHIND-THE-SCENES

INTERVIEW WITH PROF. LAN LUO

**How did you come up with this idea?**

The observation that many retailers have very different product offerings in their online and offline stores.

What was the biggest challenge in the research and revision?

To convince the review team about our key modeling assumptions. We had to collect

additional empirical data to support our assumptions.

What are the main remaining missing puzzles in this area of research?

The focal manufacturer could consider offering a product line that targets either the offline/online storefront of the dual-channel retailer.

SHARING INFORMATION WITH FARMERS – HOW WILL THEY RESPOND?

Based on Liao, C. N., & Chen, Y. J. (2017). Farmers' information management in developing countries—A highly asymmetric information structure. *Production and Operations Management*, 26(6), 1207-1220.

Review by Seth Washispack

Background

In developing countries, governments, NGOs (non-governmental organizations), and social enterprises are working to help farmers through access to information. The goal of this information is to help the farmers make informed decisions about how much to produce. There are multiple channels that farmers can receive this information. This begs the question: “What is the best way to share information?” Specifically, what methods maximize the farmers’ profit versus maximizing social welfare?

Key Insights

The authors use an analytical approach to study how information channels affect farmers’ production decision. In the model, farmers can choose from a variety of crops (and grow them at the same time). There is uncertainty in the market situation which depends upon fundamental factors, such as the global economic condition and the trend of consumers’ preference. The information each farmer receives is in the form of a signal about some of the fundamental factors. Then, the farmers make production decisions based on the signals they receive.

The authors find that if a government wants to maximize the farmers’ total profits, the government should allocate all its resources (information) to one

farmer who already receives the most signals and is in “moderate” competition with the other farmers. The authors created an index to determine which farmer should receive these resources. On the other hand, if the government wants to maximize the social welfare, they should give all farmers access to all resources (or information).

Remaining Questions

After insights are found from analytical studies, it is important to test these findings empirically. These empirical tests can support the findings suggesting similar assumptions can be used in the future, or the findings can produce diverging results suggesting new assumptions for future studies. The Nash equilibrium produced some unexpected results: “a farmer may act adversely to signals”, and “a farmer may benefit from the improvement of a signal she cannot observe.” Will similar results emerge empirically? What type of secondary data or experiments could test these results?

Want to Know More?

Recently, Liao et al. (2017) used a similar situation and demonstrated that when market information is free it is always beneficial for farmers at the individual level but may not lead to welfare maximization at the aggregate level. To maximize welfare, the government should target groups of farmers far (in terms of physical distance) from



MINI CASE

RICULT: SUPPLYING MARKET INFORMATION TO RURAL FARMERS

Over half of the world's poorest (surviving on less than \$2/day) live on small farms. While this gives them a means to live, there are multiple systemic problems that keep these farmers poor. Two of these problems are information issues: 1) lack of accurate market and weather information and 2) lack of direct access to buyers.

Using mobile technology, Ricult helps farmers gain access to credit for purchasing their crops, to market information, and to buyers for their crops. The platform has been established in

Pakistan and Thailand where they have seen an average increase in crop yield of 50%. Over 10,000 farmers are already using their platform with the hope of over 100,000 users by the end of 2019. What type of farmers should they target to maximize farmers' profit? What about to maximize social welfare? Should the app share different information with different farmers to increase the social welfare?

Case: <http://news.mit.edu/2018/ricult-thailand-pakistan-farmers-1115>

Image: <https://pxhere.com/en/photo/1025992>

the market. Additionally, they discover that for governments to employ this strategy without being perceived as unfair the information should be shared for a nominal fee.

We often assume additional information will improve market efficiency, but when offering this information in new contexts, it is important to test this assumption. One such situation is farmers in rural India. Using a natural experiment, Parker et al. (2016) find market information does improves market efficiently. Specifically, they find timely and accurate market information decreases the price dispersion by 12%.

Foundational Classical Studies

Although relatively new, the authors ground their study in socially responsible operations through two papers by the same authors (Sodhi and Tang, 2011, 2014). After this grounding, they base their model off a seminal paper on information sharing among firms (Gal-Or, 1985), which finds that a unique Nash equilibrium exists: no information sharing will occur. The authors' model is a more generalized form this original information sharing model.

References

- Gal-Or, E., 1985. Information sharing in oligopoly. *Econometrica* 53, 329–343.
- Liao, C.-N., Chen, Y.-J., & Tang, C. S. (2019). Information provision policies for improving farmer welfare in developing countries: Heterogeneous farmers and market selection. *Manufacturing & Service Operations Management*, 21(2), 254–270.
- Parker, C., Ramdas, K., & Savva, N. (2016). Is IT enough? Evidence from a natural experiment in India's agriculture markets. *Management Science*, 62(9), 2481-2503.
- Sodhi, M. S., & Tang, C. S. (2013). Supply-chain research opportunities with the poor as suppliers or distributors in developing countries. *Production and Operations Management*, 23(9), 1483–1494. doi: 10.1111/poms.12161
- Sodhi, M. S., & Tang, C. S. (2011). Social enterprises as supply-chain enablers for the poor. *Socio-Economic Planning Sciences*, 45(4), 146–153. doi: 10.1016/j.seps.2011.04.001



BEHIND-THE-SCENES

INTERVIEW WITH CHEN-NAN LIAO

How did you come up with this idea?

I am particularly interested in social network. However, whether a farmer shares information with another depends on many irrational elements like the personal relationship between these two farmers. Hence, in that paper, I focus on the farmers' response to the information disseminated through the social network already.

What was the biggest challenge in the research and revision?

In my opinion, the main challenge in research on social network is the cognitive cost of extracting managerial insights from the results. Because the complexity of the model grows rapidly with the number of nodes, it is hard to

identify the causality between the result and a specific structure or property of the network. In this case, it is hard for one to develop some general properties or rules of thumb which is applicable to most situations.

What are the main remaining missing puzzles in this area of research?

The answer to question 3 is the same as above. We do not have enough knowledge on how to understand a network and its implication yet.

If any, what is your subsequent, ongoing work in this area of research?

Recently I am working on a paper about rumor spreading in social network, and I am still trying to overcome the cognitive cost I mentioned above...

HOW TO TRANSLATE INTEGRATION INTO HIGHER PRODUCTIVITY

Based on Natividad, G. (2014). Integration and productivity: Satellite-tracked evidence. *Management Science*, 60(7), 1698–1718.

Review by Seongkyoon Jeong

Background

Historically, the decision on firm boundaries has been highlighted by many scholars that study strategy and economics. Operations and supply chain management scholars have also investigated this issue through the lens of the classical “make-or-buy problem”. In particular, since mergers and acquisitions (M&A), which blur the organizational boundaries between two business entities, disrupt the business landscape, M&A attracts significant attention both from media and academia. The basic rationale for this integration of two different organizations is quite simple: there might be some synergistic effects. Especially, vertical integration, through which a supplier and a buyer join into one organization, has been suspected as a way to reduce economic friction in contracts, thus resulting in positive return.

However, unlike the speculation, the market reaction to M&A is not necessarily positive; rather, many merging firms face pessimistic or even negative responses from investors. Then, why and when does integration provide positive returns? An empirical approach to this problem has a number of challenges. First, the integration direction (i.e., horizontal vs. vertical) is not easy to measure, especially when relying on archival data. The role each party plays in the integrated unit cannot be readily observed from the outside of the organization, so the effect of vertical integration could be confounding. Second, the purpose of integration is not measurable through archival data. Finally, the ownership and operational integrations can be decoupled. In a number of cases, firms often acquire another firm simply to improve their financial stability by creating a diversified

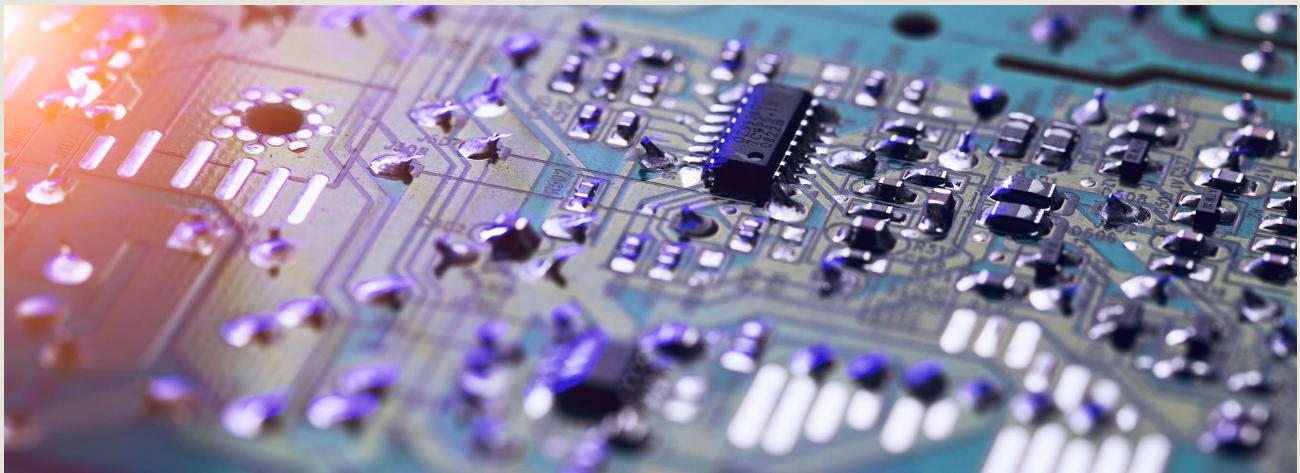
“business portfolio”. Clear evidence is needed to show the relationship between operational integration and performance.

Key Insights

The use of novel data enabled the authors to address the empirical challenges. The data of the Peruvian fishing industry clearly distinguish the upstream segment (i.e., fish extraction) and the downstream segment (i.e., fish processing) in the integration. Moreover, the satellite-tracked information enables them to observe the actual operation scenes. Using these granular data on production operations, this study investigated the economic impact of integration through the lens of TFP (total factor productivity). The results suggest that there is a significant increase in productivity after integration. The mechanisms of the positive impact are as follows: 1) the previous productivity of acquired unit does not affect that of the acquiring unit; 2) reduced transaction cost (friction from contract) is not a factor of the increase in productivity; 3) newly integrated assets with focused operations increase the productivity; and 4) the interaction between already acquiring firms’ own units and newly acquired units is the driver. These findings suggest the importance of knowledge sharing in an integrated operational structure.

Remaining Questions

Behavior and cultural factors can bar the integrated operations from achieving better efficiency. According to this study, some captains were reluctant to adopt new operational practices causing them to take more time to implement them. Although it is not surprising



MINI CASE

WHY NOT TSMC? INTEL'S 14NM SEMICONDUCTOR PRODUCTION PLAN

Intel has played the leading role in the semiconductor industry, investing a significant amount of R&D in the development of new products and production lines. Unlike, AMD, the rival firm of Intel, which has shifted from a manufacturer to a fabless firm, Intel has persistently maintained its own production capabilities and has been known for a high degree of vertical integration. Additionally, Intel's processors have shown superior performance over those of AMD in the past decade. Through Intel's continuous R&D output, the 14nm semiconductor device fabrication process was developed, and chips based on the process have been supplied to the market.

Yet, because the demand for 14nm semiconductor was higher than Intel predicted, Intel's production did not meet the market demand causing them to miss out on potential sales. In September 2018, because Intel was strategically investing in the production technology of the next generation (i.e., 10nm semiconductor device fabrication process), rumors spread that Intel outsourced part of their production of 14nm semiconductor devices to TSMC, a Taiwanese semiconductor company.

TSMC is renowned for supplying semiconductors to big buying companies such as Apple and Samsung. Thus, one could assume that such an outsourcing strategy might work well, given that TSMC has been proven as a leading supplier in the semiconductor industry. Nonetheless, the market reaction was not positive. Investors, rather, expected that partial outsourcing could increase the quality issue, thus lowering productivity. As of December 5th, Intel has not commented on the rumor.

Why did investors negatively respond to this "dis-integration"? In other words, do investors assume positive impact of "integration". If so, does vertical integration generally guarantee better quality and efficiency? If not, what are the enablers of efficacious vertical integration along the supply chain?

Case: <https://www.kitguru.net/components/cpu/damien-cox/intel-insists-it-is-handling-the-14nm-demand-on-its-own-refuting-claims-of-seeking-tsmcs-help/>

Image: Shutterstock

to observe such reactions from the captains, one can specify the drivers of and solution to the reactions: Why did the captains behave so and how can we mitigate such behavior?

This study tracked the information sharing activities and found that such activities are the key driver of the increase in productivity. While such a finding is plausible, we may need more evidence to realize the benefit of knowledge exchange in the integrated operations system. Most importantly, the drivers of knowledge sharing are unanswered. While this study shows the “effect” of knowledge sharing in vertical integration, the question as to why some share information is not answered. More broadly, one can answer what would be a good incentive system for better integration and knowledge sharing. Lastly, Kranton and Minehart (2000) provides opposing arguments: network structure (connections to suppliers) is better to smooth out shocks than vertically integrated ones. Taken that view, we can question whether integration is always good in the long run, where unexpected shocks are present.

Want to Know More?

How about innovation? Does integration increase innovation? One can assume there would be a synergy between the knowledge of the previously different organizations, but usually integration kills the knowledge base of the less dominate unit. Paruchuri et al. (2006) show that the productivity of corporate scientists of acquired companies is generally impaired by integration and that the acquired unit’s scientists

face the most severe drops because their social status declined as a result of acquisition integration. Yang (2017) attempts to address this problem in the vertical integration setting of Qualcomm. Overall, the findings suggest that vertical integration increases innovation rates and social welfare and that the main driver of the results is improved coordination of the investment by the two merged firms.

We can extend this problem onto environmental performance as well. Some studies show the relationship between M&A and environmental performance. Berchicci et al. (2017) show that the relative environmental performance might be the driver of improvement—this suggests that sharing the environmental management norms might be one of the causes of the integration effect.

Foundational Classical Studies

Atalay et al. (2014) point out the missing link in the previous literature (i.e., asset integration does not mean actual operation integration) and provide the empirical ground for this research (i.e. use of TFP). Another important stream of classical studies is the theory of integration, which extends the transactions cost view to vertical integration. Bolton and Whinston (1993) suggests that integration reduces the concern that several downstream firms must compete for inputs in limited supply. Yet, such integration increases other firms’ concerns, driving the market equilibrium to much differ from bilateral situations where we would consider a sole set of a downstream firm and an upstream firm.

References

- Atalay, E., Hortaçsu, A., & Syverson, C. (2014). Vertical integration and input flows. *American Economic Review*, 104(4), 1120-48.
- Berchicci, L., Dowell, G., & King, A. A. (2017). Environmental performance and the market for corporate assets. *Strategic Management Journal*, 38(12), 2444-2464.
- Bolton, P., & Whinston, M. D. (1993). Incomplete contracts, vertical integration, and supply assurance. *The Review of Economic Studies*, 60(1), 121-148.
- Kranton, R. E., & Minehart, D. F. (2000). Networks versus vertical integration. *The Rand journal of economics*, 570-601.
- Paruchuri, S., Nerkar, A., & Hambrick, D. C. (2006). Acquisition integration and productivity losses in the technical core: disruption of inventors in acquired companies. *Organization Science*, 17(5), 545–562.
- Yang, C. (2017). *Could Vertical Integration Increase Innovation?* (No. 908). Society for Economic Dynamics.



BEHIND-THE-SCENES

INTERVIEW WITH PROF. GABRIEL NATIVIDAD

How did you come up with this idea?

My inspiration or eureka moment emerged both from my dissatisfaction with the typical way “real-time productivity” was being measured in various industries or scholarly studies and my decade-long, first-hand knowledge of the industrial fishing industry, in which productivity and performance are fundamental constructs. I became keenly aware of a gap in the extant knowledge about productivity as an outcome, and about firm integration as a potential driver of that outcome. So, the title of my paper was already in my head before delving into the project or knowing what I would find. The key idea to craft a causal empirical design came to me throughout the process, when thinking about the research question with the data at hand and with extensive field research.

What was the biggest challenge in the research and revision?

At one point in my career, I decided to conduct this “insider econometrics” paper motivated by my desire to learn something new and important about productivity and firm boundaries. After being granted access to the data, I spent two weeks receiving all operational records on site; next I took a 23-hour industrial fishing trip for first-hand experience about operational processes; and then I spent about 18 months conducting the study before having a circulating draft. The challenge throughout the process was to be sufficiently creative and careful in the empirical design so that every subsequent step lead to solid findings, as there was not enough room for error. Later on, the biggest challenge in the revision was that I had to address the comments and requests of one Departmental Editor, one Associate Editor, and three referees during four rounds of revision; their comments were very diverse, ranging from theoretical arguments to questions about causal identification and institutional details. I was and am grateful for all the attention the paper got

from these experts, but it was not an easy job to conduct the revision as a single author.

What are the main remaining missing puzzles in this area of research?

The concept of integration – the organic cohesion of asset operations under a single firm – is fascinating yet still little understood. There have been a few recent papers that have stirred controversy about the concept and usefulness of integration. My paper, I think, offers little controversy because the econometric design is causal, and the data are extremely rich (e.g., measured from a satellite every 30 minutes for several years and many assets and geographies), but the central idea remains to be corroborated across many more industries and contexts. Does integration matter for performance? And why? We need much more causal empirical work on the make-vs.-buy decision and its links with profitability and mechanisms internal to the firm.

If any, what is your subsequent, ongoing work in this area of research?

I am broadly interested in the economics of organizations and markets; publishing this paper in Management Science made me learn about integration and productivity as part of the broader set of constructs and issues involved in how firms create and capture value in a market economy through delineating their boundaries. Currently, I am working on analyzing the geographic boundaries of thousands of firms that may allow them to fund their operations simultaneously in different local markets by taking opportunity of mining booms that create financing supply shocks. Because I do not define my research agenda narrowly around a small set of very similar questions, at the moment none of my ongoing projects deals directly with industrial productivity or operational integration. But I view this Management Science article as central in my learning about geography, market interactions, and value creation.

1+1>2? THE IMPACT OF SOCIAL MEDIA INTEGRATION

Based on Li Z. & Agarwal, A. (2017). Platform integration and demand spillovers in complementary markets: evidence from Facebook's integration of Instagram. *Management Science* 63(10), 3438-3458.

Review by Xiangjing Chen

Background

In recent years, many social media platforms have integrated with mobile applications, especially those that are complementary to the social media platforms. This kind of integration has different impacts on the integrated applications (i.e. first-party applications) and other competing applications (i.e. third-party applications). How does this integration affect the total demand on the platform? How does it affect the demand for the first-party versus third-party applications?

Key Insights

This considers the integration of Facebook and Instagram to analyze the impact of the integration event on consumer demand for first-party applications, big third-party applications, and small-party applications. The authors find that after the integration, consumers obtain additional value from Instagram so that more consumers use Instagram for Facebook photo sharing. In addition, they find that increasing the number of users of Instagram has a positive spillover effect on big third-party applications and a negative spillover effect on small third-party applications, consequently, the number of users increases for big third-party applications and decreases for small third-party applications. Interestingly, the total demand for the entire photo-sharing application ecosystem increases.

Remaining Questions

The authors test a counterfactual case, which assumes that instead of integrating with Instagram, the biggest application, Facebook integrates with the second biggest application, Pixable. They find that the gain in demand for Pixable is much lower compared to the gain in demand for Instagram. The integration has smaller effect on third-party applications and the total market demand. This is an interesting finding and could be further researched. What is the rationale behind this counterfactual scenario? Does the theoretical model really predict the reality? Can this result be applied in industries other than the social media market?

Want to Know More?

There is an article on TechRepublic, *The Top 7 Acquisitions of All-Time In Social Media, and Why They Matter*, which presents the most famous and influential cases of social media integration, such as Google buying Youtube, Facebook buying WhatsApp, Google buying Waze, etc. Killian and Mcmanus (2015) conduct seven interviews with managers and find that a cohesive brand personality is created across each platform by utilizing social media. In addition to social media platform integration, the literature also analyzes integration in other industries. For example, Sarka and Pavla (2016) discuss the effect of horizontal integration between hospitals.



MINI CASE

IS IT ALWAYS $1+1>2$?

Many social media companies have chosen to acquire and integrate with other social media companies/platforms. Vine, a short-form video hosting service founded in June 2012, was acquired by Twitter in October 2012. Facebook acquired Instagram for \$1 billion in April 2012 and WhatsApp for \$19 billion in February 2014. On October 29, 2018, Vimeo, a video-sharing website, announced integration with LinkedIn. The benefits of integration are huge. Take Facebook and Instagram for example, Instagram now (in 2018) has more than 1 billion monthly active users: a 60% increase in just three years. Instagram now generates almost one out

of every four dollars of Facebook's roughly \$20 billion in annual ad revenue. It is obvious that the integration strategy is beneficial for both Facebook and Instagram. However, is it always $1+1>2$? The story may be different for small companies that are not as giant as Facebook.

Case: <https://www.techrepublic.com/article/the-top-7-acquisitions-of-all-time-in-social-media-and-why-they-matter/> Image: <https://images.app.goo.gl/RvduCS6G2bMMTMG48>

Image source: <https://underwoodedge.com/wp-content/uploads/2018/08/william-iven-19844-unsplash-1024x680.jpg>

Foundational Classical Studies

This paper leans on the following literature: Platforms could possibly earn higher profits by expanding the user base. Brynjolfsson and Kemerer (1996) show the network effects, as measured by the size of the user base, has a positive impact on the software price. In order to develop a larger user base, according to Trusov et al. (2009), platforms

should improve their promotional capabilities that can help grow membership. As demonstrated by Aral and Walker (2011), another avenue to increase product adoption is through sharing by users. Touching on the generation of sales, Chen et al. (2011), and Li and Wu (2014) find that the promotional capabilities could generate more sales.

References

- Li, Z., & Agarwal, A. (2017). Platform integration and demand spillovers in complementary markets: evidence from facebook's integration of instagram. *Management Science*, 63(10), 3438–3458.
- Forrest, C. (2014, August 9). The top 7 acquisitions of all-time in social media, and why they matter. Retrieved from <https://www.techrepublic.com/article/the-top-7-acquisitions-of-all-time-in-social-media-and-why-they-matter/>
- M&A flashback: Instagram joins Facebook in \$1B deal. Retrieved from <https://pitchbook.com/news/articles/m-a-flashback-instagram-joins-facebook-in-1b-deal>
- Brynjolfsson, E., & Kemerer, C. F. (1996). Network externalities in microcomputer software: An econometric analysis of the spreadsheet market. *Management Science*, 42(12), 1627–1647.
- Trusov, M., Bucklin, R. E., & Pauwels, K. (2009). Effects of word-of-mouth versus traditional marketing: Findings from an internet social networking site. *Journal of Marketing*, 73(5), 90–102.
- Aral, S., & Walker, D. (2011). Creating social contagion through viral product design: A randomized trial of peer influence in networks. *Management Science*, 57(9), 1623–1639.
- Chen, Y., Wang, Q., & Xie, J. (2011). Online social interactions: A natural experiment on word of mouth versus observational learning. *Journal of Marketing Research*, 48(2), 238–254.
- Li X, Wu L (2014) Herding and social media word-of-mouth: Evidence from Groupon. Available at <http://ssrn.com/abstract=2264411>.
- Sarka, & Pavla. (2016). Horizontal integration of hospitals – does it have an impact on their effectiveness? *Procedia Economics and Finance*, 39(C), 553-561.
- Killian, & Mcmanus. (2015). A marketing communications approach for the digital era: Managerial guidelines for social media integration. *Business Horizons*, 58(5), 539-549.

GOVERNMENT STANCE – YOU'RE INTERFERING WITH OUR OPERATIONS

Based on Dube, Van Der Vaart, Teunter, & Van Wassenhove. (2016). Host government impact on the logistics performance of international humanitarian organisations. *Journal of Operations Management*, 47-48, 44-57.

Review by Xiangjing Chen and Seth Washispack

Background

The stance of host governments is instrumental to the performance of international relief operations. When the host government is open to assistance, the aid can be efficiently delivered by international humanitarian organizations (IHOs). On the other hand, if the host government rejects assistance, there would be devastating consequences. Although these polarizing stances exist, a host government's response to IHOs can be complex due to geo-political considerations. What are the different ways host government respond to IHOs? What should IHOs expect from these responses to help them effectively meet their goals?

Key Insights

The authors used a multiple-case study methodology to investigate how host governments impact humanitarian logistics. Cases of six different countries from the view of one IHO was used. The authors found that host governments respond to IHOs in the two dimensions: dependency on IHOs and levels of tension between opposing interests. This led to four different responses: non-restrictive, opportunistic, selectively accommodating, and uncompromising. These four responses lead to different effects on the IHO's logistics. A non-restrictive stance gives IHOs high chances for compromise and no major impact on

inventory management. An opportunistic stance can cause random delivery performance glitches because of opportunistic behavior but there are no major impacts to inventory management. A selectively accommodating stance causes the IHO to lose control in both areas causing increased lead times and changes to scheduling decisions. An uncompromising stance is the most restrictive where compromise rarely occurs although increases to lead time are more predictable.

Remaining Questions

The authors' samples were centered on emergency situations of civil war and political crisis. How might the findings change for natural disasters? Would the same government respond in a different way to different types of emergency crises (e.g. fast-onset vs. slow-onset)? Additionally, why do governments choose to take a particular stance? If they change their stance, what causes them to change?

Now that we understand the different stances governments take towards IHOs during emergency situations, it is important to understand how to deal with these stances. How can IHOs mitigate the limitations of the different stances? It seems the non-restrictive government stance is the best for IHOs, but is this the best for those affected by the disaster?



MINI CASE

THE KERALA FLOOD: "HELP NOT WANTED"

In August 2018, the Indian state of Kerala experienced the state's worst floods in a century. Over a million people were displaced by the flood. The state government was willing to accept foreign aid to help speed reconstruction, but the Indian central government rejected international help. The victims became angry when the national government declined an offer for foreign aid to Kerala of \$100 million from the United Arab Emirates that employs over a million workers from Kerala.

India is not the only national government in recent history that has turned down foreign

disaster relief aid. Many governments in the past decade have rejected help to demonstrate their self-sufficiency. Such stances to help can make it difficult for international humanitarian organizations (IHOs) to effectively help disaster victims. What should IHOs expect in these situations? How do similar stances by other governments affect IHOs logistics operations?

Case: <https://www.economist.com/asia/2018/08/30/indiasturns-down-disaster-relief>

Image: https://commons.wikimedia.org/wiki/File:Pala_during_2018_Kerala_floods_02.jpg

Want to Know More?

Using a macro view, the authors considered how the stances of host governments to IHOs impacts their humanitarian logistics. Recently, Dube and Broekhuis (2018) considered the micro effects of host government stances. Specifically, the authors consider how host government regulations affect humanitarian logisticians. They find that these workers often have to reconcile their professional and humanitarian identities. Besides coordinating with governments, IHOs often coordinate with other actors. Balcik et al. (2010) provide an overview of coordination practices, challenges, and opportunities for humanitarian organizations.

Other scholars have considered logistics operations once an IHO is in the country. There are multiple studies considering how to manage humanitarian vehicle fleets. Martinez et al. (2011) uses a case-study methodology to understand how IHOs manage their vehicle fleet and how this affects program delivery. Eftekhar and Wassenhove (2016) continue in this stream of research by considering

how vehicle fleets are utilized and whether the policies currently in place by the IHOs produce the expected outcomes.

Foundational Classical Studies

The authors grounded the need for a case study on previous studies demonstrating the negative effects of host government actions. Toole and Waldman (1997) explain that host governments can divert relief supplies, which is obviously a problem for IHOs. Long and Wood (1995) not only suggest that host government actions can lead to complications such as long lead times and complex customs procedures; they also explain the logistics of famine relief are unique: 1) such operations usually have inadequate infrastructures; 2) the final product consumer is not the customer of either the supplier or the carrier; 3) both military and commercial applications are considered; and 4) the political environment makes famine relief different from commercial logistics.

References

- Balcik, B., Beamon, B. M., Krejci, C. C., Muramatsu, K. M., & Ramirez, M. (2010). Coordination in humanitarian relief chains: Practices, challenges and opportunities. *International Journal of Production Economics*, 126(1), 22-34.
- Dube, N., & Broekhuis, M. (2018). Humanitarian logistics at a crossroads: How logisticians reconcile their professional and humanitarian identities in response to tougher host government regulations. *Risk, Hazards & Crisis in Public Policy*.
- Long, D. C., & Wood, D. F. (1995). The logistics of famine relief. *Journal of Business Logistics*, 16(1), 213.
- Martinez, A. J. P., Stapleton, O., & Van Wassenhove, L. N. (2011). Field vehicle fleet management in humanitarian operations: a case-based approach. *Journal of Operations Management*, 29(5), 404-421.
- Eftekhar, M., & Van Wassenhove, L. N. (2016). Fleet management policies for humanitarian organizations: Beyond the utilization–residual value trade-off. *Journal of Operations Management*, 44, 1-12.
- Toole, M. J., & Waldman, R. J. (1997). The public health aspects of complex emergencies and refugee situations. *Annual Review of Public Health*, 18(1), 283-312.

BEHIND-THE-SCENES

INTERVIEW WITH MS. NONHLANHLA DUBE

How did you come up with this idea?

I worked in the field in my home country (Zimbabwe) after my first bachelor's and most of our operational challenges were related to government actions/decisions/regulations.

Later, I got involved at the HQ level in different positions, and there, still, the conversations about host governments were dominant. When I started looking into the HL literature, I was surprised that the government was mentioned frequently enough, but there hadn't been a systematic assessment of how they impact operations. So, I took it upon myself to find out.

What was the biggest challenge in the research and revision?

In terms of research, access to practitioners was difficult. I had to be creative and having a network helped a lot because most people spoke to me because I had been referred to them by someone they knew and trusted. Also, doing the research on a limited budget meant that I also had limited options (a major one being that I would have wanted to talk to government officials for their perspective). The biggest difficulties with the revision were, first of all, being confident that we had a good understanding of what the reviewers wanted and, secondly, adding in new things while having to reduce the number of words drastically. Also, some minor alterations had a ripple effect on the paper and it was a struggle to keep the paper recognisable to the reviewers while making all necessary changes

to ensure that the storyline was clear, logical, and consistent after incorporating additional requested details.

What are the main remaining missing puzzles in this area of research?

The most important ones have been presented in the paper. However, the options are limitless. In addition, one could look at public-private partnerships between host governments and international humanitarian organisations (why they are formed, when and why they are likely to fail/ succeed), or how local humanitarian organisations experience and deal with the same governments (this can help us to understand if there is a strong case for using local organisations in certain situations although there would be a need to pay close attention to such things as equity and impartiality).

If any, what is your subsequent, ongoing work in this area of research?

One of the projects I am working on (with others, of course) looks at how IHOs deal with security-related challenges (a major theme emerging from this paper that could not be pursued). The focus is not solely on host governments as we learned from collecting data from this paper that different warring parties all pose challenges. What those challenges are, how successful different IHOs (from an OM perspective) are in different contexts and why is something we would like to establish.



MATCHING DEMAND AND SUPPLY

Matching demand and supply is one of the key essences of operations management. What makes this question complex is when we consider the matching in higher dimensions, such as time, location, multiple tiers of supply chain, different generation of products etc. In addition, every decision that firms made about the supply would also influence customers' choices, thus changing the demand side of the equation. In humanitarian area, the challenge is more severe in terms of high uncertainty and low response time. Thus, an optimized solution which can consider a wide range of scenarios is required. Unique environment in developing countries would also lead to unique solutions. Using the lens of operations management, scholars have broadened the scope of operations management and have found various themes that have a critical impact on stakeholders of operations. In this section, we review recent papers that address the major application areas in operations management. In particular, we focus on management of manufacturing and non-profit organizations, behavior and decision making, global and integrating operations, and corporate social responsibility.

Topics in This Section

Inventory and Sales – Scarcity or Variety Effect?

Based on Cachon, G. P., Gallino, S., & Olivares, M. (2019). Does adding inventory increase sales? Evidence of a scarcity effect in us automobile dealerships. *Management Science*, 65(4), 1455-1947.

Inventory Management Empirical Research Manufacturing Sector Behavioral Operations

When Disaster Strikes: Use Recourse Inventory Allocation?

Based on Morrice, D. J., Cronin, P., Tanrisever, F., & Butler, J. C. (2016). Supporting hurricane inventory management decisions with consumer demand estimates. *Journal of Operations Management*, 45, 86-100.

Inventory Management Empirical Research Non-Profit Organization Humanitarian Operations

The Best Structure for Replenishment Network: Suggestions for Micro-retailers in Developing Countries

Based on Zhang, K., Tang, C. S., & Zhou, S. (2017). Replenishment strategies for micro-retailers in developing countries. *Production and Operations Management*, 26(12), 2207-2225.

Inventory Management Analytical Research Retail Sector

Forecasting Similarly Unsimilar New Product Life Cycles

Based on Hu, K., Acimovic, J., Erize, F., Thomas, D. J., & Van Mieghem, J. A. (2019). Forecasting product life cycle curves: Practical approach and empirical analysis. *Manufacturing & Service Operations Management*, 21 (1), 66-85.

Production Management Inventory Management Empirical Research Manufacturing Sector

INVENTORY AND SALES – SCARCITY OR VARIETY EFFECT?

Based on Cachon, G. P., Gallino, S., & Olivares, M. (2019). Does adding inventory increase sales? Evidence of a scarcity effect in us automobile dealerships. *Management Science*, 65(4), 1455-1947.

Review by Seongkyoon Jeong and Seth Washispack

Background

There are two differing views about how inventory levels affect sales. Practitioners complained that low inventory level reduces sales because their customers are not able to purchase the desired product (i.e., variety effect). On the other hand, others argue that too much inventory can backfire since the customer may wait to purchase the product to consider other options since they can come back later to purchase the product (i.e., scarcity effect). To make informed inventory decisions it is important to figure out which effect is stronger and how firms can take advantage of both effects.

Key Insights

Using inventory and sales data of General Motors (GM), the authors test the two competing theories: the scarcity effect and the variety effect. Since there is a correlation between inventory and sales, exogenous weather shock at the production field is used to capture variation of the dealer's inventory level. Their findings demonstrate that increasing inventory of the same sub-model decreases sales while increasing inventory to expand the set of sub-models offered (e.g. a four-door model is added to a two-door model sub-model) increases sales. The results suggest that a “maximize variety, minimize duplication allocation strategy” could prove to be profitable for dealers. Specifically, dealers using this strategy increased sales by 4.4% without changing the total number of vehicles.

Remaining Questions

The study's empirical rigor strengthens the findings of the paper and raise questions for future study. A major question deals with generalizability of the results. These results hold for the GM automobile market. Now, think of a different market. Suppose that such products are repeatably bought by customers and that customers can stock the products (e.g., toilet papers). Do these same findings hold for other product manufacturers? Another avenue to consider is different product levels. For example, Toyota produces cars using two brands (i.e., Toyota and Lexus). Does the same effect hold for different product levels (average versus luxury)? Along the same lines, different product types (e.g. car, electronics, apparel) have different customer fit requirements and cost. Will similar results hold across different product types? If not, what is it causing the differences?

Want to Know More?

This study was able to use an exogenous shock to test the competing theories about the effect inventory of inventory on sales. Other studies have tested the effects using field experiments. Craig et al. (2016) uses a field experiment of Hugo Boss to demonstrate that increases in historical fill rates increases the retailer's current orders. More specifically they find a 1% increase in the order fill rate increases retailer's demand by 11%.



MINI CASE

JEWELRY STORES' INVENTORY PROBLEMS

New jewelry businesses are targeting niche market consumers who are interested in the experience of jewelry shopping and personalized orders. These businesses include appointment-only stores such as Samuelson's Diamonds in Baltimore, Maryland and Cheryl Fornash Jewelry in Richmond, Virginia. For these companies using the private jewelry model, inventories can be small while still being successful. But the same is not true for most jewelry stores who rely on branded jewelry.

The average inventory turns are 0.7 times/year for over 20,000 jewelry stores in the US. This dismally low number is often caused by manufacturers who require a minimum purchase level from the retailers. Often this

forces a large amount of inventory to simply sit on retailers' shelves. For the manufacturers, this may seem like a good strategy because they are selling a minimum number of products to each retailer, but what if this strategy is backfiring by causing consumers to hold out on purchasing their jewelry? Could less inventory held by the jewelry actually increase sales for the retailer and in turn increase sales for the manufacturer? Or does this high inventory increase the sales?

Case: <https://www.forbes.com/sites/andrehill/2018/08/31/what-happens-when-theres-too-much-jewelry-inventory/#ea77bd14aaa4>

Image: <https://www.flickr.com/photos/95943652@N04/10029636806>

The study and Craig et al. (2016) test the effect of inventory on sales when the customer has an idea of the inventory amount but not the exact number. In contrast, Cui et al. (2016) performs a field experiment using Amazon lightning deals, which give customers the sense of the volume of remaining items: these deals display the percentage of inventory already purchased. Their results suggest that customers learn about the deal's value through inventory information. Specifically, the authors find a 10% increase in past sales leads to a 2.08% increase in cart add-ins in the next hour.

Foundational Classical Studies

A key motivation for this study is the two competing theories suggesting different effects of inventory on sales. Kalyanam et al. (2007) provide empirical evidence for the variety and stockout effect in a non-fashion apparel category, but their dataset did not allow them to directly measure the relationship between inventory and sales. On the other hand, Balachander et al. (2009) and Stock and Balachander (2005) argue that high inventory level makes consumers infer low popularity of the items, a clue to the scarcity effect.

References

- Balachander, S., Liu, Y., & Stock, A. (2009). An empirical analysis of scarcity strategies in the automobile industry. *Management Science*, 55(10), 1623-1637.
- Craig, N., DeHoratius, N., & Raman, A. (2016). The impact of supplier inventory service level on retailer demand. *Manufacturing & Service Operations Management*, 18(4), 461-474.
- Cui, R., Zhang, D. J., & Bassamboo, A. (2019). Learning from inventory availability information: Evidence from field experiments on Amazon. *Management Science*, 65(3), 1216-1235.
- Kalyanam, K., Borle, S., & Boatwright, P. (2007). Deconstructing each item's category contribution. *Marketing Science*, 26(3), 327-341.
- Stock, A., & Balachander, S. (2005). The making of a "hot product": A signaling explanation of marketers' scarcity strategy. *Management Science*, 51(8), 1181-1192.

WHEN DISASTER STRIKES: USE REOURSE INVENTORY ALLOCATION?

Based on Morrice, D. J., Cronin, P., Tanrisever, F., & Butler, J. C. (2016). Supporting hurricane inventory management decisions with consumer demand estimates. *Journal of Operations Management*, 45, 86-100.

Review by Chao Wu and Seth Washispack

Background

Although widely studied, matching supply and demand is still an issue for businesses. This problem becomes even more difficult when a natural disaster occurs. In humanitarian logistics, high uncertainty and high penalty cost are the main challenges. (penalty as cost of life) The allocation of inventory to locations anticipating a natural disaster, such as hurricanes, is important to meet customer needs and can be a source of additional revenue for retailers. One option for inventory allocation is recourse: waiting to allocate inventory until a hurricane is close to landfall allowing for additional information about the state of the hurricane. The timing tradeoff arises at this point. If a recourse strategy is chosen, there is a risk of waiting too long keeping needed inventory from reaching the retail stores, but recourse allows for more accurate inventory allocation. So, in what settings is recourse beneficial? What is the magnitude of the benefit?

Key Insights

Using empirical data, the authors built an analytical model (based on empirical data they tested beforehand) to match supply to demand before a hurricane reaches landfall. The results based on the empirical data revealed that an often-used assumption does not hold: hurricane intensity is only weakly correlated with inventory decisions. On the other hand, the empirical results show

a strong association between hurricane weather forecast, forecasted hurricane landfall position, and hurricane sales. The authors then modeled recourse suggesting that recourse is beneficial when the region of landfall is more certain (e.g., when only one region is expected to be affected compared to multiple regions). Additionally, the initial forecast of landfall affects the optimal decision. Depending on the region of impact, the benefit of choosing recourse increases substantially.

Remaining Questions

The main focus of this study revolves around hurricanes in the US. It seems that these results can be generalized to other developed countries, but a new model may be needed for developing countries. Less sophisticated meteorological information and less developed infrastructure in these countries could reveal different insights regarding the use of recourse. Is recourse beneficial in these situations? If so, when is it beneficial?

Hurricanes were the main theme of this paper. A similar natural disaster is tornados, but some different results may be found because of the differences in destruction across the two disasters. While hurricanes can leave massive amounts of rainfall requiring abnormal modes of transit to get around after the disaster, tornados are more short-term. How do these different characteristics change the inventory allocation decisions? Is the tornado



MINI CASE

RETAILER'S INVENTORY ALLOCATION DECISION FOR HURRICANE FLORENCE

Although natural disasters cause unknown demand events, they are not surprises. Large retailers, such as Walmart, have crisis teams to help coordinate for disasters such as hurricanes. These teams help to make sure associates and inventory are safe before, during, and after the disaster. Often people in affected areas will stock up in preparation for these disasters. This change in behavior by customers requires inventory reallocation by retailers, but there are different strategies for reallocating the inventory.

Leading up to Hurricane Florence, large retailers such as Kroger, Publix, and Walmart were

making inventory decisions in the Carolinas. Some retailers choose a recourse plan of action where they send some initial inventory and waited to send a second set of inventory after learning more about the storm. The risk of this action is the inability for the second set of inventory to reach the store before the storm. Was this decision beneficial? In what other situations would this action be it beneficial?

Source: <https://progressivegrocer.com/hurricane-florence-how-top-grocers-are-helping-residents-prepare>

Image: <https://www.flickr.com/photos/danramarch/30718129048>

intensity more closely linked to tornado sales when compared to hurricanes? Are there changes to the benefits of recourse inventory allocation?

Want to Know More?

There are several other studies considering inventory allocation for hurricanes. Lodree and Taskin (2009) use hurricane speed updates to manage inventory, where the model assumes demand is linked to hurricane intensity. Taskin and Lodree (2011) propose a Bayesian decision model for hurricane forecast to improve inventory allocation decision. Uichanco (2016) use two-stage robust optimization to determine preposition strategy regarding the uncertainty of typhoon. Sabbaghtorkan et al. (2019) synthesize the literature on this topic between 2000 and 2018 and identify research gaps.

Humanitarian logistics is another area of interest. Along the same lines of inventory, Acimovic and

Goentzel (2016) consider logistics metrics. They use an analytical approach to create humanitarian logistic metrics that can decrease cost by 7% to 20%.

Foundational Classical Studies

Studies considering inventory decisions in the situation of natural disasters are relatively new, but this study still relies on some classical inventory management papers. One of these papers is Eppen (1979), which focuses on optimizing inventory for a single warehouse, multiple retailer system. Additionally, the authors rely on Federgruen and Zipkin (1984) to help simplify their analytical model. The most informative classical study (mentioned by the authors) was McGavin et al. (1997) that deal with balancing inventory for a single product from one distribution center to multiple retailer locations.

References

- Acimovic, J., & Goentzel, J. (2016). Models and metrics to assess humanitarian response capacity. *Journal of Operations Management*, 45, 11-29.
- Eppen, G. D. (1979). Note—effects of centralization on expected costs in a multi-location newsboy problem. *Management Science*, 25(5), 498-501.
- Federgruen, A., & Zipkin, P. (1984). Approximations of dynamic, multilocation production and inventory problems. *Management Science*, 30(1), 69-84.
- Lodree Jr, E. J., & Taskin, S. (2009). Supply chain planning for hurricane response with wind speed information updates. *Computers & Operations Research*, 36(1), 2-15.
- McGavin, E. J., Ward, J. E., & Schwarz, L. B. (1997). Balancing retailer inventories. *Operations Research*, 45(6), 820-830.
- Taskin, S., & Lodree Jr, E. J. (2011). A Bayesian decision model with hurricane forecast updates for emergency supplies inventory management. *Journal of the Operational Research Society*, 62(6), 1098-1108.
- Sabbaghtorkan, M., Batta, R., & He, Q. (2019). Prepositioning of assets and supplies in disaster operations management: review and research gap identification. *European Journal of Operational Research*.
- Uichanco, J. (2016). A robust model for pre-positioning emergency relief items before a typhoon with an uncertain trajectory. Submitted to *Manufacturing & Service Operations Management*.

THE BEST STRUCTURE FOR REPLENISHMENT NETWORK: SUGGESTIONS FOR MICRO-RETAILERS IN DEVELOPING COUNTRIES

Based on Zhang, K., Tang, C. S., & Zhou, S. (2017). Replenishment strategies for micro-retailers in developing countries. *Production and Operations Management*, 26(12), 2207-2225.

Review by Seth Washispack and Seongkyoon Jeong

Background

Many multination companies have begun to sell their products in developing countries such as Brazil and India. These companies (e.g., Coca-Cola, Unilever, Nestle) have found their traditional strategies will not work in these countries because of a lack of infrastructure and because they are serving different types of consumers. For example, in India, Unilever sells daily shampoo packs because their customers do not have enough income to purchase larger bottles. A major issue in developing countries for all these companies is how to get their products to consumers especially those who live in rural villages. In other words, what is the best way for the micro-retailers who sell to the customers in these rural villages? Should there be a micro-retailer who acts as a distributor to get quantity discounts? Should each micro-retailer go to the manufacturer individually?

Key Insights

In this paper, the authors consider the replenishment strategies of micro-retailers in developing countries. There are specific challenges when considering these micro-retailers since most are very small (sometimes only a small cart) and potentially far away from

the supplier. They consider three different types of replenishment – formal, hybrid, and informal – to understand when these strategies are optimal. Formal replenishment includes a supplier, a wholesaler, and retailers; hybrid replenishment includes a store that is both a retailer and wholesaler; and informal replenishment does not include a wholesaler; instead, the retailers individually travel to the supplier.

The authors used an analytical model to determine the dominant strategies and other insights about replenishment strategies for micro-retailers. Their first model demonstrated findings for a simplified two-store model, but they extended their findings to include “variable operating costs, price competition, local monopolies, and different decision sequences”. They find that a hybrid strategy is best under high travel costs and a formal strategy is best for medium travel costs, while an informal strategy is best for low travel costs. When conflict of interest arises from a store operating as a wholesaler and retailer, transitioning from an informal to hybrid strategy makes both stores better off. In contrast, consumers are not beneficiaries of the transition from informal to hybrid strategies unless the supplier offers quantity discounts.



MINI CASE

WHY DO MICRO-RETAILERS IN DEVELOPING COUNTRIES PROTEST AGAINST SUGAR TAX?

In developing countries, a number of lay people rely on small businesses that do not have significantly high entry barriers. One of the sectors is retail. Because transportation infrastructure is not sufficiently established in those countries, small retail businesses have mushroomed, fulfilling frequently consumed items (e.g., food ingredients and consumer packaged goods). Many of the businesses transact accepting cash only, and the volume of cash transactions by such businesses in these counties far exceed that of developed countries. To that extent, small retailers live upon the sales of the daily or frequent consumption generated by near-distance customers. In 2017, the Philippines' government attempted to impose a "sugar tax" on products that include sugar while about 40% of income of small retailers comes from soft drink and powdered drink products.

Despite the expected positive effect on the health condition of customers, small retailers reject sugar tax imposition. They argued that the bill on the sugar tax is anti-poor and would only be a burden to small micro-retailer, consumers, sugar farmers, and manufacturing plant workers. To that extent, Micro-retailers in developing countries play a significant role in the retail sector.

Case: <http://www.worldbank.org/en/news/press-release/2016/06/27/small-retailers-transact-19-trillion-in-cash-annually-new-world-economic-forum-and-world-bank-group-study-shows>

<https://www.foodnavigator-asia.com/Article/2017/11/30/Small-retailers-and-trade-organisations-protest-against-Philippines-sugar-tax>

<https://www.manilatimes.net/small-retailers-reject-sugar-tax-imposition/354439/>

Image: <https://pxhere.com/en/photo/969504>

Remaining Questions

Since this study was based on analytical modeling, a natural extension would be an empirical exploration into the factors that contribute to the choice of formal, hybrid, or informal strategies by micro-retailers. If there are not any “natural” hybrid systems, must these systems be continually supported by outside help? Also, if a hybrid system is chosen, what is the best method to choose the hybrid store (i.e., the store that acts as both a retailer and a distributor)? In addition, the authors did not consider uncertainty. Since many developing countries are growing rapidly, they often face more volatility than developed countries. In this dynamic nature, which type of strategy is more proper to address uncertainty? What would be the dominant strategy?

What to Know More?

This study considers more traditional replenishment strategies that are successful in developed countries, but there are other innovative replenishment strategies that might be more beneficial in

developing countries. For example, Gui et al. (2018) consider how purchasing cooperatives and nonprofit wholesalers affect the retail price. They find both can be beneficial in unregulated markets, but in unregulated markets the nonprofit wholesaler might create a higher retail price.

Most of the OSCM (Operations and Supply Chain Management) research has focused on large companies, but a recent trend in OSCM focuses on studying less traditional OSCM situations (Pagell et al., 2017). Part of this has been spurred by the interest in socially responsible operations, which often focuses on developing countries (Sodhi and Tang, 2014; Tang and Zhou, 2012). Reading Tang (2018) can help researchers determine other socially responsible operations research projects.

Foundational Classical Studies

Besides relying on the citations considering socially responsible operations (Sodhi and Tang, 2014; Tang and Zhou, 2012), they also rely heavily on Dietrich (2009) to understand the situation of micro-retailers in the Philippines.

References

- Dietrich, M., 2009. Achieving scale and sustainability in a social enterprise at the base of the pyramid—case of Hapinoy, Philippines. Southern New Hampshire University, Manchester, UK.
- Gui, L., Tang, C. S., & Yin, S. (2019). Improving microretailer and consumer welfare in developing economies: Replenishment strategies and market entries. *Manufacturing & Service Operations Management*, 21(1), 231–250.
- Pagell, M., Fugate, B., & Flynn, B. B. (2017). From the editors-introducing JSCMs first emerging discourse incubator for 2018/19. *Journal of Supply Chain Management*, 53(3), 76–77. doi: 10.1111/jscm.12144
- Sodhi, M. S., & Tang, C. S. (2013). Supply-chain research opportunities with the poor as suppliers or distributors in developing countries. *Production and Operations Management*, 23(9), 1483–1494. doi: 10.1111/poms.12161
- Tang, C. S. (2018). Socially responsible supply chains in emerging markets: Some research opportunities. *Journal of Operations Management*, 57(1), 1–10. doi: 10.1016/j.jom.2018.01.002
- Tang, C. S., & Zhou, S. (2012). Research advances in environmentally and socially sustainable operations. *European Journal of Operational Research*, 223(3), 585–594. doi: 10.1016/j.ejor.2012.07.030
- Zhang, K., Tang, C. S., & Zhou, S. (2017). Replenishment strategies for micro-retailers in developing countries. *Production and Operations Management*, 26(12), 2207–2225. doi: 10.1111/poms.12755

FORECASTING SIMILARLY UNSIMILAR NEW PRODUCT LIFE CYCLES

Based on Hu, K., Acimovic, J., Erize, F., Thomas, D. J., & Van Mieghem, J. A. (2019). Forecasting product life cycle curves: Practical approach and empirical analysis. *Manufacturing & Service Operations Management*, 21 (1), 66-85.

Review by Seongkyoon Jeong and M. Ryan Hatton

Background

While sales from new products account for a large portion of overall sales, there is high uncertainty of the sales pattern. By definition, new products are newly introduced to the market, so prior to product launch, no sales data are available to use in predicting the future sales pattern of the products. Since new products come with new business plans in diverse domains such as production, logistics, supply management, and marketing, a referenceable expected sales profit is required.

Previous studies conceptualize the pattern of new product diffusion, using the framework of the life cycle curve. It is widely known that the life cycle curve follows a bell-shape form and that the life cycle is divided into several stages such as introduction, growth, maturity, and decline. Yet, previous empirical evidence also suggest that the shape of the life cycle curve varies by product and, most importantly, the exact period of each stage in the life cycle is not easy to estimate. Then, how can we estimate life cycle curve of new products, without complicated modeling and revealed sales data?

Key Insights

This paper shows product life cycle (PLC) curves using the sales data of Dell's new computer models. One problem in the industry is that although

we know that PLC follows the bell-shape, the parameters of the curves are unknown until the end of the product life cycle. This problem becomes more serious when producers launch a new product, which has not had any previous sales sample. The authors suggest that similar previous products may be good reference points to estimate the product life cycle.

The authors tested the shape of PLC curves of new computers. Surprisingly, the results suggest that a lot of the computer models have a very short maturity stage or do not have the maturity stage in the curve. After clustering the product types and adding seasonality effects, this study proposes a way to predict the life cycle pattern of a new product, which is relatively accurate, compared to Dell's internal work. This simple but powerful approach enables managers to handle the heterogeneity in the life cycle easily. Rather than building a theoretical framework for estimating the curve parameters, managers can predict the parameters, using a data-driven clustering model.

Remaining Questions

What if we do not have any similar previous models to a new product that we are interested in? While the data-driven approach has advantage in applicability, it does not fully explain how the results were formed. Do all products follow the bell-shape curve? As shown in this research, some products



MINI CASE

PRODUCT LIFE CYCLE: CAN APPLE'S NEW IRING CONTINUE THE "I" TREND DEMAND

The wrist-worn GPS device has been a trend for exercise and smart-device enthusiasts alike. Having the ability to sync smart phones to a wrist-worn smart watch which includes GPS technology has allowed active individuals to consolidate their smart devices down to one: the wrist-worn device alone. With the high pressure on innovation, Apple has taken more steps to continue the consolidation effect even more: from wrist-worn to "finger-worn." Apple has invented the Apple Ring. With all great intentions, Apple looks to improve ease of

use and efficiency. However, will the demand increase similar to other smart devices? Can historical trends in Apple's iPod/iPad/iPhone sales be helpful for Apple to predict the new demand patterns? If so, how can we estimate the patterns?

Case: <https://patentyogi.com/latest-patents/apple/did-apple-just-patent-the-apple-iring/>

Image: <https://www.thesun.co.uk/wp-content/uploads/2019/10/ARG-APPLE-RING.jpg>

are not. For example, movie ticket sales may follow a decaying curve. Another question is correlation between the old and new models. While similar models provide foundational data for prediction, we can expect the cyclic purchase pattern associated with carnivalization. For example, a customer would not buy a similar computer to what the customer already has. Similarly, models that fall into the same cluster may have substitutional effects between them. In this context, how can we model PLC that is influenced by introduction of similar products? Furthermore, how can we apply such a concern to the estimation of the absolute demand level?

Want to Know More?

The classic paper by Day (1981) addresses research issues associated with PLC. A classical concept in and of itself, PLC has been tested numerous times. Previous authors (e.g., Cox, 1967) argue that PLC may exist not only in a bell-shaped form but also

in many possible forms (e.g., linear increasing, linear decreasing, and third or fourth order curves with saddle points). In addition, the authors of this study published another paper (Acimovic et al., 2018), which explains how the data was collected, cleaned, and normalized. Interestingly, the data is open to researchers upon request. It might be useful for researchers in this field.

Foundational Classical Studies

Two classical studies providing the foundation of this research come from Bass (1969) and Kahn (2002). Bass builds up a fundamental analytical framework for the rational for the bell shape curve. Innovators and imitators (in the consumer group) have different timing of purchase, which in turn makes the bell curve. Providing a more contemporary study, Kahn presents the interesting survey results for the actual practices in forecasting. The study is worth noting when conducting research on behind-scenes forecasting.

References

- Acimovic, J., Erize, F., Hu, K., Thomas, D. J., & Mieghem, J. A. V. (2019). Product life cycle data set: Raw and cleaned data of weekly orders for personal computers. *Manufacturing & Service Operations Management*, 21(1), 171-176.
- Bass, F. M. (1969). A new product growth for model consumer durables. *Management Science*, 15(5), 215-227.
- Cox, W. E. (1967). Product life cycles as marketing models. *The Journal of Business*, 40(4), 375-384.
- Delaney, Ben. 2018. Retried from <https://www.bikeradar.com/us/road/gear/article/best-gps-devices-for-cycling-43224/>
- Day, G. S. (1981). The product life cycle: analysis and applications issues. *Journal of Marketing*, 45(4), 60-67.
- Kahn, K. B. (2002). An exploratory Investigation of new product forecasting practices. *The Journal of Product Innovation Management*, 19, 133-143.
- Ritche, R. (2019). Retrieved from <https://www.imore.com/history-iphone-original> (02/01/19)

BEHIND-THE-SCENES

INTERVIEW WITH PROF. KEJIA HU

**How did you come up with this idea?**

Initially, we began meeting with Dell to help them optimize their operations. Interestingly, we realized Dell's forecasting at the time needed improvement. For optimization, we needed parameters, but the current practice wasn't satisfactory to get the parameters. So, we switched our research direction to forecasting to obtain the parameters. Fortunately, my background fit this question well.

What was the biggest challenge in the research and revision?

Luckily enough, this paper went through the review process smoothly. However, for all empirical research, it requires a lot of efforts to understand the data. We needed to understand the data structure and what the coded value means. The units, the method of Dell's calculation and their approach of recording. We spent quite some time to communicate

with the demand planners and the supervisors of supply chain management team to understand the data before starting our analysis.

What are the main remaining missing puzzles in this area of research?

Although we provided one forecasting method in our paper, there are numerous forecasting methods. One future avenue could be finding a dynamic updating forecasting model.

If any, what is your subsequent, ongoing work in this area of research?

For now, I'm focused on service management and sustainability projects. Although these new projects are not closely tied to this paper, I'd like to stress, especially to PhD students, that exploration of research topics is important during your PhD. The forecasting research with Dell was a fun and rewarding experience to me.

INTERFACE WITH CONSUMERS

Interface with consumers may take different forms of channels. Sellers can meet their customers in a public place (i.e., farmers market), a dedicated and well-stocked store, or a showroom. On the other hand, some sellers choose to “meet” with customers in a more distant way; call centers and internet are the two most popular venues. In this section, we will discuss a few unique phenomena such as offline showroom (i.e., retail stores demonstrate product but do not carry inventory for sale), social media as an online version of “word of mouth” effect, technology usage on the website to help customers find right products (and reduce regret) etc. We also look beyond what these new channels mean to sellers or customers. Specifically, we review two papers talking about the environmental impact of online shopping and how to decrease discrimination in online environment.

Topics in This Section

Is Social Media a New Channel to Improve Operational Efficiency?

Based on Lam, H. K., Yeung, A. C., & Cheng, T. E. (2016). The impact of firms' social media initiatives on operational efficiency and innovativeness. *Journal of Operations Management*, 47, 28-43.

Empirical Research Technology Management IT Sector

Offline Showrooms for Online Sales

Based on Bell, D. R., Gallino, S., & Moreno, A. (2018). Offline showrooms in omnichannel retail: Demand and operational benefits. *Management Science*, 64(4), 1629-1651.

Empirical Research Behavioral Operations Retail Sector

Click Here to Buy and More!

Based on De, P., Hu, Y., & Rahman, M. S. (2010). Technology usage and online sales: An empirical study. *Management Science*, 56(11), 1930-1945.

Empirical Research Behavioral Operations IT Sector

If You Know Your Customers May Regret It, How Should You Handle and Leverage Their Regret?

Based on Jiang, B., Narasimhan, C., & Turut, Ö. (2016). Anticipated regret and product innovation. *Management Science*, 63(12), 4308-4323.

Innovation Management Analytical Research Manufacturing Sector

Subscription or Per-Order: Profits and Environmental Impact of Online Grocery Shopping

Based on Elena Belavina, Karan Girotra, Ashish Kabra (2017) Online grocery retail: Revenue models and environmental impact. *Management Science* 63(6):1781-1799.

Business Analytics Analytical Research Retail Sector

Birds of a Feather...Want to Ride with Drivers of the Same Feather?

Based on Ta, H., Esper, T. L., & Hofer, A. R. (2018). Designing crowdsourced delivery systems: The effect of driver disclosure and ethnic similarity. *Journal of Operations Management*. 60, 19-33.

Service Management Empirical Research Service Sector

Decreasing Discrimination in the Sharing Economy

Based on Cui, R., Li, J., & Zhang, D. (2018). Discrimination with incomplete information in the sharing economy: evidence from field experiments on Airbnb. *Management Science*, Forthcoming

Service Management Empirical Research Service Sector

IS SOCIAL MEDIA A NEW CHANNEL TO IMPROVE OPERATIONAL EFFICIENCY?

Based on Lam, H. K., Yeung, A. C., & Cheng, T. E. (2016). The impact of firms' social media initiatives on operational efficiency and innovativeness. *Journal of Operations Management*, 47, 28-43.

Review by Xiangjing Chen and Chao Wu

Background

Like it or not, social media has gained more attention from firms in terms of organizational purposes. Starbucks has launched a social media platform called My Starbucks Idea to enable customers to participate in developing new drinks and flavors. Caterpillar adopted the Spredfast platform to facilitate internal departments and external dealers. Slack is another software platform where professionals can easily communicate with their coworkers (either within or outside of their organization). Even though many firms have established their internal or external capabilities in social media, there has been no empirical study on what the benefits using social media provide to firms. Does social media really improve employee's connectivity to customers and create synergy between them in service operations? Or maybe social media only serves as a substitutional workforce and even decrease the productivity of employees.

Key Insights

The purpose of this study is to empirically evaluate operational implications of using social media such as strengthening firm-customer interaction and improving collaboration between firms and customers. Using data of 281 firms that have announced usage of social media in public between 2006 to 2012, this study suggests that social media initiatives improve firms' operational efficiency and

innovativeness. Operational efficiency is measured through Stochastic Frontier Estimation (SFE), which is an approach to find over-performers within a comparative group in multiple dimensions (e.g., revenue and size). Innovativeness is measured by media rating based on the *Factiva* dataset, a business information research tool that aggregates content from both licensed and free sources.

Remaining Questions

Social media could be a double-edge sword. Firms can publish positive news through social media and ubiquitously interact with customers. However, social media can also be a channel through which bad news can be easily delivered to current and potential customers. Given that bad news spreads faster with higher impact, such an incident of bad news can critically harm the reputation and performance of firms. Would a good social media channel serve alleviate a PR crisis? In other words, would lack of management and investment in social media worsen a PR crisis? In addition, are "good" and "bad" social media initiatives affect firms' performance symmetrically?

The use of social media differs by various demographic and cultural dimensions. For example, young students are more active in social media, and according to a recent report in East Asia, consumers over 50s are the group that watch YouTube videos the most. Given this heterogeneity, how would demographic and cultural factors as a moderator



MINI CASE

BACKLASH TO D&G: THE STRIKE FROM CHINESE SOCIAL MEDIA USERS

Elon Musk has been known to connect with customers on Twitter. And Tesla's customers can expect response and solutions from Tesla very quickly. In Dec 10th 2016, a Tesla customer complains on Twitter that a lot of Tesla vehicle owners leave their cars in the supercharger stations for a long time while they go shopping, work out in gyms or eat out somewhere nearby; this practice creates a significant congestion in supercharger stations. Elon Musk acknowledged this problem within hours and promising to

take action to solve it. Within 6 days, Tesla responded to customers with a solution to the congestion problem. This is a textbook solution for companies to utilize social media channel to learn and respond to customers' concerns.

Case: <https://www.inc.com/justin-bariso/elon-musk-takes-customer-complaint-on-twitter-from-idea-to-execution-in-6-days.html>

Image: <https://pxhere.com/en/photo/423732>

in the relationship between social media initiatives and firm's performance?

Want to Know More?

Uratnik (2016) find that “organizations interact with social media and reduce diseconomies of scope” but they also co-destroy value. Social media initiatives not only affect the performance of firms that conduct the initiatives but also affect their competitors. He et al. (2017) find that the competitive effect exists between a focal firm and non-focal firms. Non-focal firms offering similar products can benefit from customers switching from the troubled focal firm that undergoes a product-harm crisis.

Foundational Classical Studies

Organizational knowledge is developed through interactions between organizations and their customers (Yli-Renko et al., 2001), which can be done through social media initiatives. The impact of social media initiatives on firm performance can be understood by the resource-based view (RBV). RBV of a firm's information capability becomes more important in the OM field because OM researchers are increasingly focused on organizational routines within and across firms (Hitt et al., 2016). Information and knowledge being shared via social media are visible to different parties and enable collaboration thus improve efficiency (Kane et al., 2014).

References

- Lam, H. K., Yeung, A. C., & Cheng, T. E. (2016). The impact of firms' social media initiatives on operational efficiency and innovativeness. *Journal of Operations Management*, 47-48(1), 28–43. doi: 10.1016/j.jom.2016.06.001
- Cheng, M. (2018, November 30). The 5 biggest corporate social media fails of 2018. Retrieved from <https://www.inc.com/michelle-cheng/biggest-corporate-social-media-fails-2018.html>
- Uratnik, M. (2016). Interactional service innovation with social media users. *Service Science*, 8(3), 300–319. doi: 10.1287/serv.2016.0149
- He, S., Rui, H., & Whinston, A. B. (2018). Social media strategies in product-harm crises. *Information Systems Research*, 29(2), 362–380.
- Yli-Renko, H., Autio, E., & Sapienza, H. J. (2001). Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal*, 22(6-7), 587–613.
- Hitt, M. A., Carnes, C. M., & Xu, K. (2015). A current view of resource based theory in operations management: A response to Bromiley and Rau. *Journal of Operations Management*, 41(1), 107–109.
- Kane, G. C. J., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2014). Moving beyond marketing: Generating social business value across the enterprise. *MIT Sloan Management Review*, 56(1), 1–18
- Bariso, J. (2016) Elon musk takes customer complaint on Twitter from idea to execution in 6 days. Inc. Retrieved from <https://www.inc.com/justin-bariso/elon-musk-takes-customer-complaint-on-twitter-from-idea-to-execution-in-6-days.html>

OFFLINE SHOWROOMS FOR ONLINE SALES

Based on Bell, D. R., Gallino, S., & Moreno, A. (2018). Offline showrooms in omnichannel retail: Demand and operational benefits. *Management Science*, 64(4), 1629-1651.

Review by Seth Washispack & Chao Wu

Background

In the past two decades, business models have transitioned from focusing on products to focusing on services and from offline to online. As a result, online-only business models have gained more popularity. Some of these businesses are based on innovative products like smartphones and wearable computers while others are based on more traditional products like clothes and mattresses (e.g. Boohoo, Casper). The common point among these businesses is to reduce or eliminate the cost of distribution and of maintaining offline stores. However, realizing that some customers still want to experience the products before the purchase (especially expensive ones), some firms have begun experimenting with an innovative store model: showrooms. Showrooms do not hold inventory to be sold, instead, it holds advanced model of their products in the stores allowing customers to experience the product and later purchase online (usually in the showroom). A couple examples include Warby Parker, Bonobos, and Tuft & Needles. Although there are strong theoretical reasons for showrooms, are they actually beneficial? Do they help to boost sales? And how do they impact operational costs?

Key Insights

This study tests how showrooms influence demand generation and operational efficiency. A quasi-experiment with Warby Parker was undertaken to study this phenomenon. They used a difference-in-differences (DID) econometric approach, data

before and after Warby Parker's opened showrooms, and US census data (e.g., zip code demographics). The authors highlight four findings: 1) showrooms increase overall and online demand; 2) showrooms generate operational spillovers to other channels by attracting customers who, on average, have a higher "cost-to-serve"; 3) showrooms increase operational efficiency by increasing conversion and decreasing returns; and 4) showrooms amplify demand and operational benefits in dealing with customers who have the most acute need for the firm's products.

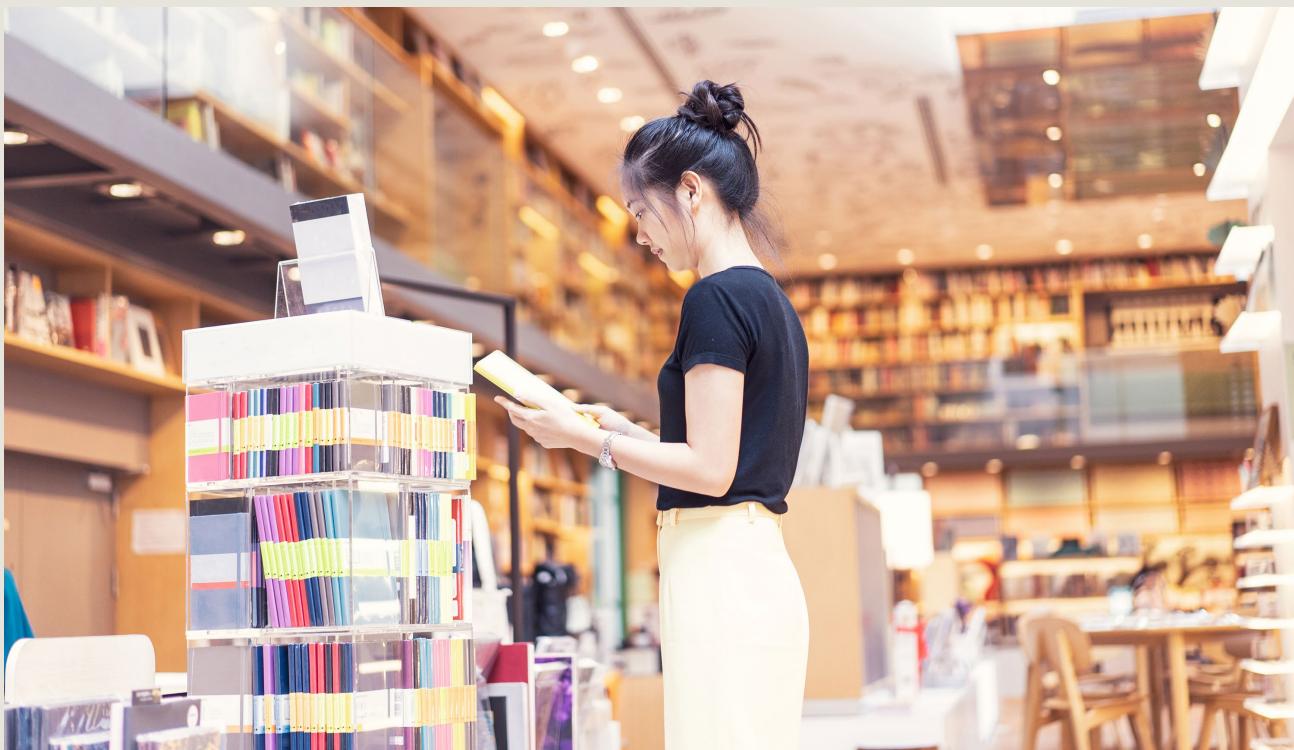
Remaining Questions

This paper studies the showrooms effect on demand generation and operational efficiency. The findings demonstrate that both online and overall demand increases and operational efficiency improves. An interesting extension could be the effects of showroom for products that are under development, especially in the high-tech industry. How would customers respond to concept products? How would this affect the new product development and the eventual response by customers for the finished product?

The authors shortly mentioned the concept of pop-up stores; in essence, these stores are mobile showrooms where brands can show off their products while customers still purchase the product online. Interestingly, this concept has become popular among large companies such as Google, Nike, and Adidas.¹ What are the benefits of these pop-up stores in comparison to showrooms? What type of products are best suited for this store type?

1

<https://www.thestorefront.com/mag/12-most-talked-about-pop-up-stores-2016/>



MINI CASE

AMAZON SHOWROOMS – AND WHAT IS EXPECTED IN THE FUTURE

Some consumers might have an opportunity to visit an Amazon - a little bit ironical in the sense that Amazon, which knocked Barnes & Noble out of the game, started to expand onto the market of offline bookstores. Yet, when customers first walk in the stores, they may find Amazon bookstores more than a bookstore. Amazon bookstores have all types of Amazon smarthome devices from speakers to security cameras and give you first-hand experience to learn technology enabling such devices. In other ways, these stores can function both as bookstores and showrooms to promote Amazon's new products and services to customers. One benefit of having a offline showroom is gaining first hand insights from

customer directly. Not only customers would tell you whether they like your product or not, but they may also tell you what they want to have in the future. Think about what may happen to the retail industry if this practice works out well: any offline retail stores may turn into a showroom for online businesses, and some online-based retail firms may outsource this kind of offline showroom business. What would be the future of online and offline retail business?

Case: <https://go.forrester.com/blogs/what-retailers-can-learn-from-the-amazon-book-store/>

Image: <https://go.forrester.com/blogs/what-retailers-can-learn-from-the-amazon-book-store/>

So far, channels such as showrooms, brick-and-mortar, and online stores are often differentiated in terms of information provisioning. What other differentiating factors exist for these stores (e.g., distribution factors)? If distribution factors exists, what type of economies of scale exist for the different store types? Additionally, how do these differentiating factors affect customer shopping behaviors and how do these changes in behavior affect demand generation and operational efficiency?

Want to Know More?

A possible extention of this study is understanding how showrooms affect firm profitability since this article only considered the revenue side. Kuksov and Liao (2018) explore a different type of showrooming where customers visit brick-and-motar stores but purchase online at another store. Many believe this is a big threat to retailers. Using an analytical model, Kuksov and Liao (2018) demonstrate that customers who use brick-and-motar stores for showrooming could find this behavior profitable if manufacturers are willing to directly compensate retailers for the informational value the reatiler is producing for the manufacturer. Another recent analytical study, Jing (2018), suggests that showrooming has the ability to intensify competition and lower profits for both the online and traditional retails. The author in this

study also considers how webrooming, searching online and purchasing at a traditional retailer, affects competition and profits.

Another trend is to help increase the information customers can gain from online-first stores is virtual try-on. One third party company, Metal, provides 3D models of customers allow them to try on clothes virtually.² Gillino and Moreno (2018) were able to run a randomized experiment with Metal demonstrating the value of virtual try-ons. They found this new information channel increases conversation and decreased fulfillment costs by decreasing returns and home try-on behavior.

Foundational Classical Studies

To support their defense concerning the operational efficiency of showrooms, the authors cite Eppen (1979) on the benefits of centralized fulfillment. They also lean on Rosenbaum and Rubin (1983) to support their choice of propensity scores in their econometric model. Another foundational study (Byrnjolfsson and Smith, 2000) considered frictions for the online channel; this study builds on that study by demonstrating a new channel to reduced the friction of the online channels even more (i.e., through showrooms).

References

- Bell, D., Gallino, S., & Moreno, A. (2018). Offline showrooms in omnichannel retail: demand and operational benefits. *Management Science*, 64(4), 1629-1651.
- Jing, B. (2018). Showrooming and webrooming: Information externalities between online and offline sellers. *Marketing Science*, 37(3), 469-483.
- Brynjolfsson, E., & Smith, M. D. (2000). Frictionless commerce? A comparison of Internet and conventional retailers. *Management Science*, 46(4), 563-585.
- Eppen, G. (1979). Management science note-effects of centralization on expected costs in a multi-location newsboy problem.
- Gallino, S., & Moreno, A. (2018). The value of fit information in online retail: evidence from a randomized field experiment. *Manufacturing & Service Operations Management*, 20(4), 767-787.
- Kuksov, D., & Liao, C. (2018). When showrooming increases retailer profit. *Journal of Marketing Research*, 55, 549-473.
- Rosenbaum, P., & Rubin, D. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41-55

CLICK HERE TO BUY AND MORE!

Based on De, P., Hu, Y., & Rahman, M. S. (2010). Technology usage and online sales: An empirical study. *Management Science*, 56(11), 1930-1945.

Review by Xiangjing Chen and M. Ryan Hatton

Background

Time has accelerated since the days when it was exciting to read today's news on that new thing called the world wide web. Currently, the internet has become so second nature that it is practically first nature: even toddlers can surf the web with a point and a click! Somewhere along the way, just reading things on the internet was not enough; companies had to go and make it possible to do business and buy things on the internet. Retailers have refined their approach at presenting online purchases to consumers. This online refinery has permeated throughout most online sales but none more so than online retailer clothing. How do customers use the online sites? How do different uses affect online sales?

Key Insights

The main research centers on the promoted and nonpromoted sales and the effects of contributing factors such as directed searches, nondirected searches, and recommendation systems. The authors collect data that contain information of all orders placed through the partner company's Internet channel (and also its catalog channel) from May 2003 to April 2006. The research found that directed searches have positive impacts on promoted products and negative impacts on nondirected products. In addition, the authors found that a recommendation system has positive impacts on both promoted and nonpromoted products. Having a clearer picture of results from directed

searches, the research was not able to determine the impact of nondirected search on sales.

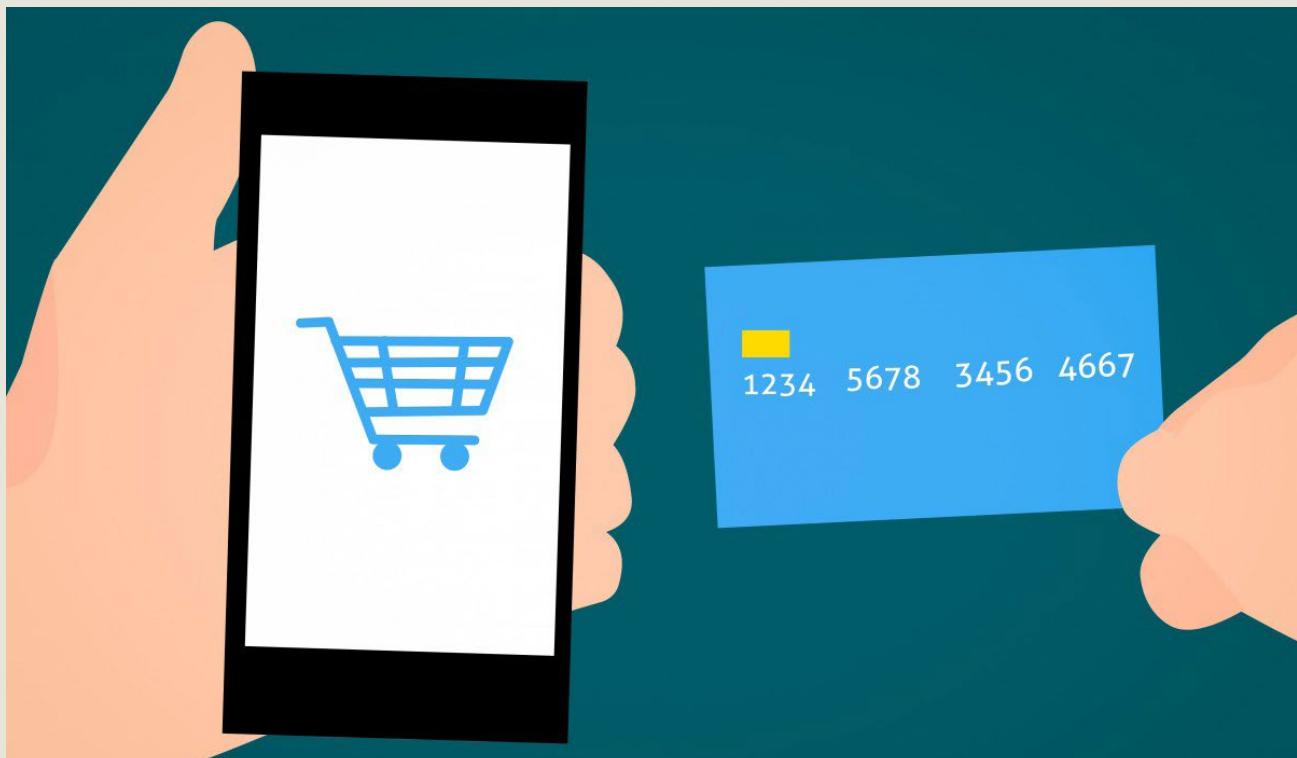
Remaining Questions

The authors tested their hypotheses in the context of women's clothing and found the above results. However, would the results hold for other online retail products? For example, the recommendation system may affect the sales of luxury products and of grocery differently. Besides the price difference of different product types, what other potential factors could lead to the differences? Imagine the market for "big ticket items" such as TVs and furniture. The effect of search could be stronger or weaker.

Another remaining question is that the extant studies typically assume there is only one type of online channel. However, there are sub-categories within the online channel, such as Internet access by mobile phones and by desktops. The screen sizes are different, which may have an impact on the efficacy of direct search engines verses recommendation systems.

Want to Know More?

This article considers technology usage by customers. One type of technology usage is the recommendation systems provided by the retailers, which could have different impacts on sales. Lee et al. (2015) explores this idea and explains that different recommendation system algorithms would lead to different impacts on sales. To be specific, the "Customers who bought this item also bought" algorithm could bring more lift



MINI CASE

WAL-MART'S ONLINE RETAIL EVOLUTION: WHAT ELSE ARE THEY CAPABLE OF?

The retail giant has come a long way from its humble beginnings in Arkansas. Having morphed from a discount department store to a supermarket including groceries, Wal-Mart has improved its online shopping presence as well. With online retail sales ramped up substantially in the past several years, Wal-Mart continues to compete as well.

Wal-Mart has made great use of the "Related Items" references of online buying so that when consumers add items to their cart or even click an item to review, there is a list of "related items" section below that prompts curiosity. In addition to the "related items" section, after purchasing items Wal-Mart has applied an

"amazon-like" experience by displaying "others who purchased item 'x' also purchased item 'y'" section. The saying "you can't teach an old dog new tricks" does not seem to fit the Wal-Mart business model. Having made so many, what would appear to be, aggressive efforts to improve retail sales, what insights could Online Wal-Mart sales transactions provide? Could Wal-Mart learn from the research and continue to re-invent itself in total revenues?

Case: <http://www.usatoday.com/story/money/2018/10/23/walmart-shoppers-can-make-returns-get-free-shipping-when-buying-fro-third-party-seller/1730531002/>

Image: <https://pxhere.com/en/photo/1439799>

in views and more lift in the number of items purchased than the algorithms of “Customers who viewed this item also viewed”. Furthermore, Demirezen et al. (2016) suggests when developing a recommendation system, a company should not only consider consumers’ preferences, but also its own inventory level.

Foundational Classical Studies

This investigation is developed from the classical studies of Engel et al. (1990) and Sismeiro and Bucklin (2004). Engel et al. (1990) explains that

consumers first use their memory to do internal information search, and then conduct external searches for additional information. The internal information search relates to the use of direct searches, while external searches relate to the nondirected search and recommendation system. Since website features are an important part of technology usage, this article leans on Sismeiro and Bucklin (2004) who analyze the features of an E-commerce web site on consumer’s purchase behavior.

References

- Demirezen, E., & Kumar, S. (2016). Optimization of recommender systems based on inventory. *Production and Operations Management*, 25(4), 593-608.
- Engel, J., R. Blackwell, P. Winiard. (1990). Consumer Behavior. Dryden Press, Hinsdale, IL.Jones, Charisse. “Walmart expands free two-day shipping and returns option for shoppers in time for holidays.” USA Today, Gannett Satellite Information Network, 23 Oct. 2018, www.usatoday.com/story/money/2018/10/23/walmart-shoppers-can-make-returns-get-free-shipping-when-buying-fro-third-party-seller/1730531002/.
- Lee, Dokyun. (2015). Three essays on big data consumer analytics in e-commerce Publicly Accessible Penn Dissertations. 1830. <http://repository.upenn.edu/edissertations/1830>
- Sismeiro, C., & Bucklin, R. (2004). Modeling purchase behavior at an e-commerce web site: a task-completion approach. *Journal of Marketing Research*, 41(3), 306-323.

IF YOU KNOW YOUR CUSTOMERS MAY REGRET IT, HOW SHOULD YOU HANDLE AND LEVERAGE THEIR REGRET?

Based on Jiang, B., Narasimhan, C., & Turut, Ö. (2016). Anticipated regret and product innovation. *Management Science*, 63(12), 4308-4323.

Review by Xiangjing Chen and Seongkyoon Jeong

Background

Introducing new products is an important growth strategy for firms. However, many consumers may find it difficult to assess the value of new attributes added to products. Uncertain preferences can drive consumers to overestimate or underestimate the usefulness of new features, which may result in post-purchase regret. This regret does not come from the product quality per se but from the uncertainty about how much the new feature would actually benefit the consumer. Consumers may change their purchase decisions to alleviate or minimize the regret. If that tendency is true, when is it profitable for an incumbent to remind consumers that they might regret switching to a new entrant's product? When is it profitable for a new entrant to encourage consumers to adopt its new product by reminding them of the potential future regret of buying the old product? Does anticipated regret decrease or increase firms' profits? If so, how does the consumer's anticipated regret affect the entrant's innovation or quality decision?

Key Insights

This paper examines how consumers' anticipated regret affects product innovation using a game-theoretic model, in which an entrant introduces an improved product with a new feature and

in which some consumers are uncertain of the value the feature. Using the model, it outlines the optimal innovation and pricing strategies for firms in markets where anticipated regret is prevalent. In turn, it provides suggestions to the innovating entrant and the incumbent on how to profitably manage consumers' anticipated regret. The authors discovered three main findings: 1) anticipated regret can sometimes intensify price competition and sometimes mitigate it, which in turn can increase or decrease firms' profits and foster or hinder product innovation; 2) anticipated regret has a nonmonotonic effect on firms' profits and the entrant's optimal quality; the nonmonotonic relationship exists regardless of whether consumers are more averse to switching regret (should have stayed to the original product) or more averse to repeat-purchase regret (should have switched to a new product); and 3) the incumbent has more to gain or lose by reminding or mitigating regret than the entrant and hence should be more cautious about reminding or mitigating regret.

Remaining Questions

What type of innovation are the authors considering? While most innovation discussed in the paper indicates product innovation, one can extend the model into one that incorporates various



MINI CASE

REMEMBER WHAT YOU DIDN'T LIKE: SAMSUNG'S STRATEGY TO RECALL PAST REGRETS

Ever since Apple launched the first mega-hit cellphone, iPhone 2G in 2007, Samsung and Apple have had a long battle in the premium mobile phone market. After several unsuccessful product launches (e.g., Samsung Omnia), in response to Apple's iPhone lineup, Samsung launched Galaxy, the flagship cellphone brand of its own. Although the features that Samsung Galaxy phones had were comparable to those of iPhone, Apple mostly led the premium cellphone market. As a result of technological advance, Samsung started to launch cellphone products that had relative advantages in some features, but the market did not fully value

the advances in terms of the market share. In November 2017, Samsung released a TV commercial that reminds customers of their regret of choosing an iPhone (in a previous purchase) instead of Samsung. By showing the history of repeated regrets, Samsung attempted to suggest there might be the potential of future regret as current iPhone customers purchase another iPhone. Why did Samsung choose this marketing strategy and did this reminder work?

Case: <https://www.theverge.com/2017/11/6/16611758/samsung-mocks-iphone-x-commercial>

Image: <https://pxhere.com/en/photo/1453505>

types of innovation (e.g., radical and incremental innovation). While this study compares products from incumbents and entrants in the same product category, one can assume that with different product categories, product functionality can overlap. For example, MP3 players could compete with smartphones. In this case, how should we model the blurred product boundaries?

Firms do not stop paying attention to the previous product customers. As the entrant releases new products, incumbents can run buy-back programs. Furthermore, as we observe from telecommunication services providers, some service providers guarantee the use of up-to-date flagship phone, by replacing the old phones of customers with new phones when the new phones are released. Overall, there are several mitigation strategies that handle regret problem. What are their roles in the model and how can we address the mitigation strategies?

Want to Know More?

Syam et al. (2008) investigate the effect of anticipated regret on consumers' preferences for customized and standardized products. This paper addresses a topic similar to this study. Nasiry and Popescu (2012) investigate the effect of anticipated regret on the consumer's advance purchase decision. Gao and Su (2017) research the uncertainty of product value for omnichannel retailing. Diecidue et al. (2012) investigate the forward-purchase and spot-purchase decisions of consumers with uncertain product valuations.

Consumers face the tradeoff between "wait" and "nonwait" purchase and have to take the risk of purchase regret regarding "markdown" versus "stockout". Consumer may choose to wait for a lower price but finally encounter stockout; while sometimes consumers purchase the product at the high price and the product is still available at the markdown price later. Özer & Zheng (2015) discusses the anticipated regret from a different perspective, the price and inventory perspective. Gowrisankaran & Rysman (2012) captures consumers' forward-looking behaviors.

Foundational Classical Studies

How do consumers avoid future regret? The literature in marketing has a long history on this topic. Cooke et al. (2001) study how future regret influence future purchase timing decisions. When deciding a purchase a customer may wonder whether they should have purchased earlier or later, depending on the information available before and post purchase. The authors find that consumers postpone their purchasing decision to minimize future regret, even if this reduces their expected utility.

Inman and Zeelenberg (2002) study factors that can influence consumers' regret for decisions that either to maintain status quo or switch to a different product. Classic literature contends that maintaining the status quo leads to less regret than switching. This turns out not to be true if the consumer's reason for purchasing decision is considered. For example, if there is a sufficient reason for switching, then a consumer will the purchase regret less than maintaining status quo.

References

- Diecidue, E., Rudi, N., & Tang, W. (2012). Dynamic purchase decisions under regret: price and availability. *Decision Analysis*, 9(1), 22-30.
- Nasiry, J., & Popescu, I. (2012). Advance selling when consumers regret. *Management Science*, 58(6), 1160-1177.
- Özer, Ö., & Zheng, Y. (2015). Markdown or everyday low price? The role of behavioral motives. *Management Science*, 62(2), 326-346.
- Syam, N., Krishnamurthy, P., & Hess, J. D. (2008). That's what I thought I wanted? Miswanting and regret for a standard good in a mass-customized world. *Marketing Science*, 27(3), 379-397.
- Inman, J. J., & Zeelenberg, M. (2002). Regret in repeat purchase versus switching decisions: the attenuating role of decision justifiability. *Journal of consumer research*, 29(1), 116-128.
- Cooke, A. D., Meyvis, T., & Schwartz, A. (2001). Avoiding future regret in purchase-timing decisions. *Journal of Consumer Research*, 27(4), 447-459.
- Gao, Fei & Su, Xuanming. (2017). Online and Offline Information for Omnichannel Retailing. *Manufacturing & Service Operations Management*, 19(1), 84-98.
- Gowrisankaran, G. and M. Rysman (2012). Dynamics of consumer demand for new durable goods. *Journal of Political Economy*. 120(6), 1173-1219.

BEHIND-THE-SCENES

INTERVIEW WITH PROF. BAOJUN JIANG



How did you come up with this idea?

Having experienced many regrettably purchases in my life, I wondered how anticipating such regret would change consumer decisions and how firms will be affected.

What was the biggest challenge in the research and revision?

The models were hard to solve with many cases. We also had to change the models many times at the request of the reviewers (e.g., different game sequences, having heterogeneity, etc.).

What are the main remaining missing puzzles in this area of research?

Product line decisions and channel issues can be interesting areas of exploration in this context.

If any, what is your subsequent, ongoing work in this area of research?

I have a working paper that examines how consumer's anticipated regret will affect a firm's product line design decisions.

SUBSCRIPTION OR PER-ORDER: PROFITS AND ENVIRONMENTAL IMPACT OF ONLINE GROCERY SHOPPING

Based on Elena Belavina, Karan Girotra, Ashish Kabra (2017) Online grocery retail: revenue models and environmental impact. *Management Science* 63(6):1781-1799. <https://doi.org/10.1287/mnsc.2016.2430>

Review by Xiangjing Chen and Chao Wu

Background

Grocery shopping has always been an important part of people's life, however, as the modern pace of life gets faster, it tends to be more difficult for people to find time for grocery shopping. Online grocery retail can be an effective way to save customers' trips to store. In general, there are two types of revenue models, subscription based and per-order based. Subscription based refers to unlimited orders with annual fee while per-order based refers to being charged for each delivery (e.g. \$5 delivery fee). Retailers need to choose which revenue model to implement. This leads to the natural question: In what context is each fee structure more effective? In addition to the revenue, these two systems affect environmental emission by the customer and company and the food waste by the customer. How does the two revenue models affect the environmental impact of the system?

Key Insights

The purpose of this study is to evaluate which type of revenue model is better in terms of firm profitability and/or environmental benefits (by measuring emission due to trips and food waste). There are three key findings and implications. First, when the adoption rate is low, per-order type is preferred for higher profits. Second, for cities where

the transportation is easily assessible, subscription model is preferred for higher profits. Third, food waste emission dominates driving mileage emission in environmental benefits, thus, subscription model almost always dominates the per-order type.

Remaining Questions

This paper assumes that product quality is the same for online grocery and offline grocery. However, this assumption might not be true in reality. Therefore, future research may analyze the optimal way to assess online product quality. One major reason Webvan failed is that customers are used to assessing grocery quality in person. Thus, uncertainty of product quality should be considered, which can affect customers' choice in choosing channels (online or offline), companies/brands, and types of products. What is the best way to entice those customers who are uncertain about their grocery quality? Is segmentation or guarantees a profitable strategy?

Another concern revolves around the distribution of customer visits. It is not clear whether customers' prior trips affect the future trips. This paper uses Poisson distribution to describe customer visits. Future research may collect real transaction data to find the true distribution.



MINI CASE

AMAZON PRIME NOW WILL DELIVER GROCERIES IN US, UK, FRANCE, INDIA, JAPAN

First launched in 2014 in only a part of New York City, Prime Now quickly expanded its service to prime members around the globe. Since Aug 2017, Amazon has expanded its grocery business by acquiring Whole Foods. Currently, it offers only per-order based delivery on a variety of products from Whole Foods: 2-hour delivery for \$4.99 or free delivery for baskets over \$35. A survey conducted by Cowen & Co in 2016 estimated that 25% of prime members have used Prime Now.

Instacart, on the other hand, offers both per-order based and subscription based online grocery shopping. It offers a \$3.99 per order for

2-hour delivery or \$149 annual fee for 1-hour delivery as well as a 5% service fee. Which model, per-order based or subscription based, is more profitable? Which model is better for the environment? Which is more popular in what countries/cultures? Are there any other alternatives in addition to these two models?

Case: www.forbes.com/sites/donaldmarvin/2018/09/18/quality-brick-and-mortar-is-key-to-success-in-online-grocery-delivery/#2e8f51083a10

www.supermarketnews.com/online-retail/viewpoint-online-grocery-really-going-explode-us

Image: <https://pxhere.com/en/photo/1449137>

In addition, this paper only analyzes one business model, that is, a single online grocery retailer. There are also more types of business models in online grocery, such as online grocery platforms. For example, Instacart, founded by a former Amazon employee, aggregates many other grocery retailers. On the other hand, Prime Now only works with Whole Foods. These two different models attract different type of customers, which can be a future research opportunity.

Want to Know More?

Marvin (2018) explains the importance of quality in online grocery delivery. John Elstrott, the former chairman of Whole Foods' board, explains the importance of the physical stores where the company can showcase the quality of the food (Marvin 2018). Rogers (2018) discussed the

reasons why online grocery has not exploded in the US. On the contrary, online grocery has succeed in China and Foley (2014) explained the reason is the delivery system.

Foundational Classical Studies

This study leans on a recent study by Cachon and Feldman (2011) which compares the subscription revenue model and per-order revenue model in the context of consumer services. In addition, the authors base part of the environmental benefits portion of the model using insights from Cachon (2014) who analyzed the environmental impact of operational decisions by comparing the environmental performance of different supply chains. Furthermore, this paper captures the impact of the shape of customers' living area on customers' decisions, which is based on the Daganzo (1984).

References

- Belavina, E., Girotra, K., & Kabra, A. (2017). Online grocery retail: Revenue models and environmental impact. *Management Science*, 63(6), 1781–1799.
- Neiger, C. (2016, March 3). 7 things you probably don't know about Amazon Prime now. Retrieved from <https://www.fool.com/investing/general/2016/03/03/7-things-you-probably-dont-know-about-amazon-prime.aspx>
- Marvin, D. (2018, September 18). Quality brick-and-mortar is key to success in online grocery delivery. Retrieved from <http://www.forbes.com/sites/donaldmarvin/2018/09/18/quality-brick-and-mortar-is-key-to-success-in-online-grocery-delivery/#2e8f51083a10>
- Rogers, D. (2018, August 28). Viewpoint: Is online grocery really going to explode in the US? Retrieved from <https://www.supermarketnews.com/online-retail/viewpoint-online-grocery-really-going-explode-us>
- Cachon, G. P. (2014). Retail store density and the cost of greenhouse gas emissions. *Management Science*, 60(8), 1907–1925.
- Cachon, G. P., & Feldman, P. (2011). Pricing services subject to congestion: Charge per-use fees or sell subscriptions? *Manufacturing & Service Operations Management*, 13(2), 244–260.
- Daganzo, C. F. (1984). The length of tours in zones of different shapes. *Transportation Research Part B: Methodological*, 18(2), 135–145.
- Foley, J. (2014, August 11). China's e-commerce secret weapon: the delivery guy. Retrieved from <http://bit.ly/reutersdelguy>

BEHIND-THE-SCENES

INTERVIEW WITH PROF. ELENA BELAVINA

**How did you come up with this idea?**

As I moved to a new place, my grocery store was very far away, and I was going infrequently and, as a result, throwing away a lot of food. At the same time, Amazon Fresh came out with their new offering: Subscription for Amazon Fresh. The subscription model looked very attractive to me because I will be able to shop a bit at a time but often (since each delivery is free), which also meant I would waste less. I realized that this also meant that subscription model for groceries might not be as attractive for the firm, because customers would waste less, which means the company would sell lower volume of groceries (consumer waste is sales for the company). This was the impetus for the paper and as it turned out, this was not the full story. Subscription could be a win both for consumers, firms and the environment due to lower food waste.

What was the biggest challenge in the research and revision?

The biggest challenge was to create a model that captures the main elements of the environment, but which is parsimonious enough to be tractable.

What are the main remaining missing puzzles in this area of research?

Food waste is a new and exciting topic for the operations management community and there are limitless opportunities for academically rigorous and practically relevant studies.

If any, what is your subsequent, ongoing work in this area of research?

I have studied the impact of grocery store density on the food waste in the market. We explored the impact of the advent of online grocery retailing. Now we are exploring food waste reduction opportunities in restaurant kitchens using innovative technological solutions and field experiments. We are also working with NGOs in developing countries to reduce food waste in the food for education programs.

BIRDS OF A FEATHER...WANT TO RIDE WITH DRIVERS OF THE SAME FEATHER?

Based on Ta, H., Esper, T. L., & Hofer, A. R. (2018). Designing crowdsourced delivery systems: The effect of driver disclosure and ethnic similarity. *Journal of Operations Management*. 60, 19-33.

Review by M. Ryan Hatton and Seongkyoon Jeong

Background

So far, crowdsourced delivery systems have focused on the economic incentive between the platform and users and the interaction between service users. Yet, we need to consider the social side of users. On consideration is how the old adage, “birds of a feather, flock together” applies to consumer transactions in crowdsourcing. In the case of crowdsourced delivery systems (CDSs), do customers want to ride with, have their food delivered by, and ultimately give patronage to delivery drivers who share their same ethnicity? If the social characters of service providers matter, should we disclose the information of service providers so that service users know by whom the service is provided?

Key Insights

This empirical study investigates the effects of different crowdsourced delivery system designs related to disclosure and ethnicity of drivers on customers’ perceptions, trust, and outcomes. The authors use social identity theory (SIT), which explains the behavior of people when they associate themselves with the group with whom they identify, as a foundation. Using data from a scenario-based experiment with 761 participants, this study finds that prior to even the actual delivery, customers’ expectations and perceptions can be shaped by CDS design. In particular, the disclosure of ethnic profile played a significant role. Overall, it is usually

better for a CDS to disclose the ethnicity of the driver and even better to have an ethnically diverse pool of drivers as opposed to a single ethnicity or even not disclosing the ethnicity at all.

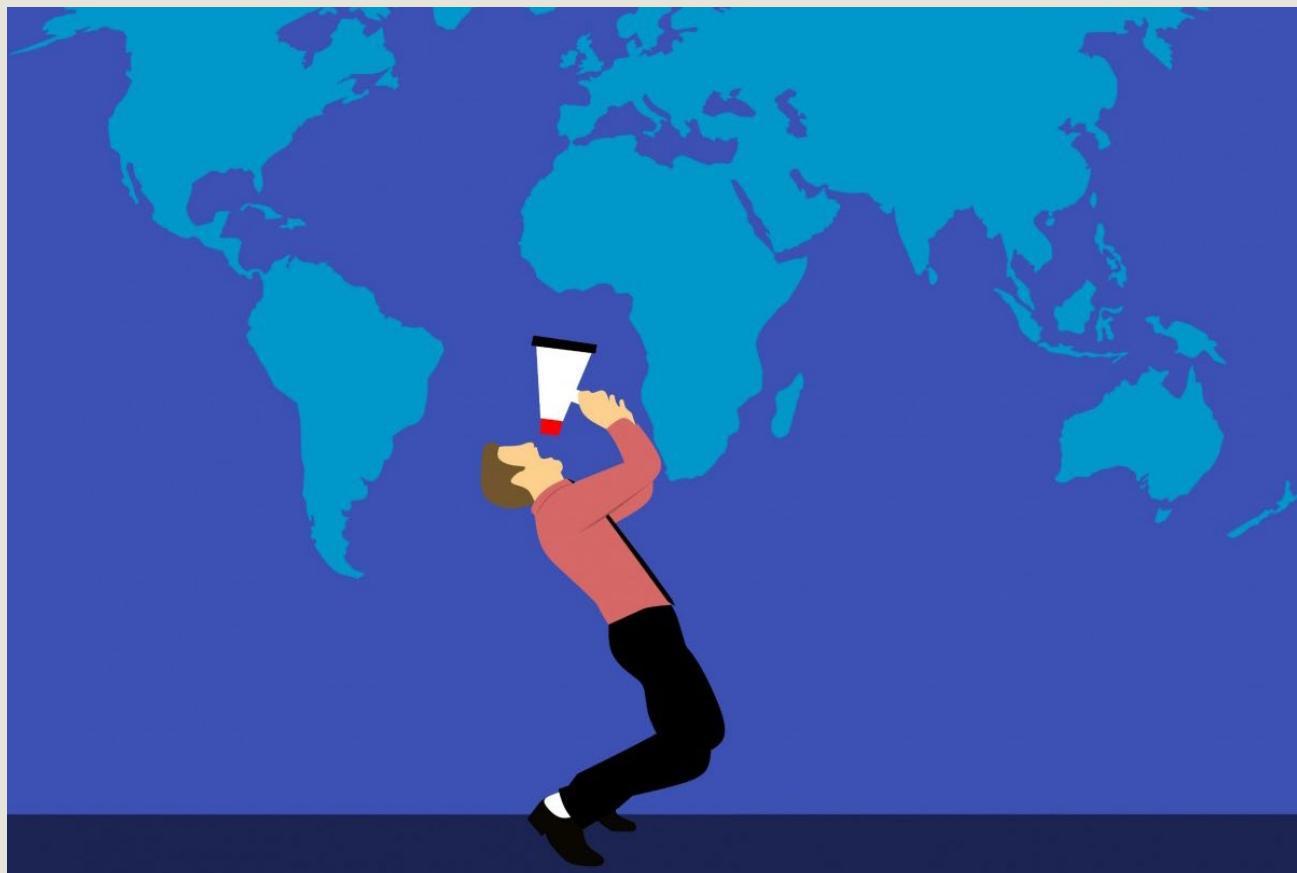
Remaining Questions

The results suggest that matching ethnicity is helpful for businesses to mitigate perceived or actual bias and hence improve the business’s service quality. This study could be expanded for an even more comprehensive look at the overall social construct within CDS’s. How are perceptions affected with respect to age or gender? Can we find the same pattern if we use different socially definable categories? If we find different results, what differentiates the effect?

Other questions remain for other trust related settings. For example, personal donations for humanitarian organizations demonstrate a trust-related setting. Donors cannot fully trust how programs are run, and donation decisions are critically influenced by social profiles. How much does bias related to target ethnic profiles (e.g., target refugees or regions) affect the donation amount?

Want to Know More?

Most crowdsourcing services are based on Internet services. The results shown could be caused by the nature of online services (Daniels 2013). For example, do people become more discriminative



MINI CASE

CALL CENTERS ARE NOW COMING BACK TO AMERICA

As the Internet enabled inexpensive international telecommunication services, a number of call centers were offshored. In particular, India, where labor cost is inexpensive and where recruiting English speakers is no difficult, has been playing a salient role for businesses. Recently, however, call centers have begun to return to the US. The conditions that enabled offshoring to India did not change much. The international telecommunication cost did not increase significantly, and the relative labor cost gap between the U.S. and India still exists. Then, why is this reshoring occurring? A recent analysis brings us anecdotal evidence that

supports the important role of homophily based on cultural similarity: "Perhaps most important, American customers are tired of talking with foreigners who could, strictly speaking, converse in English, but where communication was lost because of their accents and because they couldn't create the cultural understanding that so often is necessary even for mainly technical conversations."

Case: [http://www.areadevelopment.com/
BusinessGlobalization/Q3-2015/call-centers-reshoring-
instead-of-offshoring-271444.shtml](http://www.areadevelopment.com/BusinessGlobalization/Q3-2015/call-centers-reshoring-instead-of-offshoring-271444.shtml)

Image: <https://pxhere.com/en/photo/1447727>

online? And is the tendency getting more noticeable or weakening over time? An interesting outlook using big data from a major online dating app firm reveals³ that strong homophily is present and that the strength of homophily did not fall during the five years of observations. Then again, promoting increased diverse pairings through a service can alleviate the homophily tendency (Hutson et al., 2018), supporting the importance of service design and interaction between users, as noted in this study.

References

- Anderson, R. E. (1973). Consumer dissatisfaction: The effect of disconfirmed expectancy on perceived product performance. *Journal of Marketing Research*, 10(1), 38–44.
- Daniels, J. (2012). Race and racism in internet studies: A review and critique. *New Media & Society*, 15(5), 695–719.
- Goldstein, S. M., Johnston, R., Duffy, J., & Rao, J. (2002). The service concept: the missing link in service design research? *Journal of Operations Management*, 20(2), 121–134.
- Li, M., & Choi, T. Y. (2009). Triads in services outsourcing: Bridge, bridge decay and bridge transfer. *Journal of Supply Chain Management*, 45(3), 27–39.
- Hutson, J. A., Taft, J. G., Barocas, S., & Levy, K. (2018). Debiasing desire. *Proceedings of the ACM on Human-Computer Interaction*, 2(CSCW), 1–18.
- Rouges, J.-F., Montreuil, B., 2014. Crowdsourcing delivery: new interconnected business models to reinvent delivery. 1st International Physical Internet Conference, pp.28–30.
- Schneider, S. K., & Northcraft, G. B. (1999). Three social dilemmas of workforce diversity in organizations: A social identity perspective. *Human Relations*, 52(11), 1445–1467.
- Tajfel, H. E. (1978). *Differentiation Between Social Groups: Studies in the Social Psychology of Intergroup Relations*. Academic Press.

Foundational Classical Studies

This study used two classical studies for foundational concepts. First, Tajfel's Social Identity Theory (1978) provided the basis for customer's identifying with drivers of the same ethnicity. Second, Anderson's (1973) work with service delivery expectations of customers as a critical factor to final customer satisfaction provides a solid framework for relating the CDS design to the Social Identity aspect.

BEHIND-THE-SCENES

INTERVIEW WITH PROF. HA TA



How did you come up with this idea?

The idea of the paper was inspired by the proliferation of the “gig economy” in general and of the “UBER model” in package delivery, which is very technology-enabled and technology driven. At the same time, there were studies and news about how UBER’s or Airbnb’s disclosure of customers and drivers’ information has caused issues for both sides. This raised questions about just how the interface design could trigger social issues and affect the service operations in the crowdsourcing contexts.

What was the biggest challenge in the research and revision?

The biggest challenge in the research and revision was to reframe the conversation in the paper to highlight its relevance to OM. Initially, we focused on the diversity issue and the interface between marketing and behavioral operations. So, in the first round, even though the reviewers were intrigued by the diversity angle, the biggest question they had was how it was an OM topic and related to OM audience. Thanks

to insightful feedback from the editors and reviewers, we then repositioned the paper, focused on the technology design perspective, collected new data, and basically transformed the paper.

What are the main remaining missing puzzles in this area of research?

The crowdsourced delivery is a quite new and unexplored research area. There are a lot of issues that have not been addressed. Most studies thus far have been conceptual. For example, one big question is whether or not the crowdsourced delivery model is really low-cost and effective, as claimed.

If any, what is your subsequent, ongoing work in this area of research?

We have several ongoing projects in this stream of research. These projects focus on the application of crowdsourcing models in different areas of OM and SCM, for example, delivery, inventory audit, innovations, etc...

DECREASING DISCRIMINATION IN THE SHARING ECONOMY

Based on Cui, R., Li, J., & Zhang, D. (2018). Discrimination with incomplete information in the sharing economy: Evidence from field experiments on Airbnb. *Management Science*, Forthcoming

Review by Seth Washispack & Chao Wu

Background

Even though large strides in civil rights occurred decades ago, racial discrimination is still a common social problem today. Sharing economy companies such as Uber, Lyft, and Airbnb have observed this on their platforms: African American customers are more likely to experience longer wait times and higher cancelation rates for ride-sharing services and are less likely to be accepted by hosts for home rentals. How to solve this issue though depends on the causes of discrimination. There are two opposing views to explain discrimination: imperfect information and taste-driven preferences. So, which view is correct? How can we develop systems to improve equality?

Key Insights

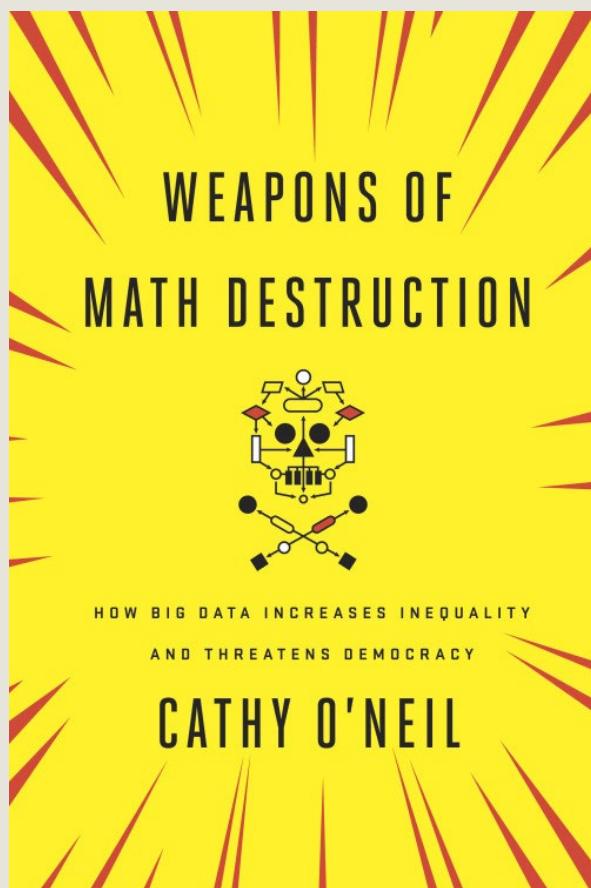
A field experiment on Airbnb with 1,801 hosts was conducted to understand whether reviews could help attenuate discrimination among white and black guests. Simulated profiles using black- and white-sounding names were created. Then, profiles were manipulated for different types of reviews (e.g. positive, positive self-claimed information, etc.). When the profile did not include a review, the white guest requests were accepted 19.2% more often. When one positive view was present, the acceptance rate for both races increased; additionally, the acceptance rates between the black- and white-sounding names was no longer significant. The same effect occurred when one

non-positive review or a blank review was present: the acceptance rates were the same. It is important to note that the self-claimed information was ineffective. In this case, white-sounding names were 12.8% more likely to have their requests accepted. Overall, peer-generated review systems can help attenuate the prevalence of discrimination in the sharing economy.

Remaining Questions

This study demonstrates discrimination can be attenuated for those with black-sounding names. This is a good start, but there are many other minority groups that are also discriminated against (e.g. Asian, Middle Eastern). Is a similar level of discrimination present for these minority races? Do minority groups discriminate against one another at the same rate? Do reviews still play the same role? Would social identity theory hold in this context suggesting that hosts of similar backgrounds discriminate less often than hosts of different backgrounds?

In this study, the authors considered how hosts discrimination against guests. It would be interesting to see if the opposite holds: Do guests discriminate against hosts? If discrimination exists against host, in what way does this happen? Can reviews also be used to diminish discriminatory behavior? If not, what other mechanisms can be used to decrease this discriminatory behavior?



MINI CASE

ALGORITHMS AS AIDS FOR REVIEW SYSTEMS

The need for a fair review system is not only important for sharing economy platforms, it is also critical many key decisions that could impact our life. Cathy O'Neil, the author of *Weapons of Math Destruction*, recently had an interview with DataHub and talked about the problems with algorithms for the review system. She gave a few examples that algorithms which were supposed to help predict the outcome of complex social problems actually led to discrimination. Specifically, she mentioned the case of judges using a recidivism predicting tool as a decision support tools. However, after going through the algorithm and the decision factors, she found that the algorithm is basically

predicting if a person is an African American. For example, some of the questions are "Are you from an African American neighborhood?" "Does your neighborhood have a high crime rate?" Similarly, a lot of algorithms that are supposed to bring equality and justice to society have achieved the opposite effect. How can society ensure that discrimination is eliminated from these algorithms?

Case: <https://www.npr.org/2018/01/26/580617998/cathy-oneil-do-algorithms-perpetuate-human-bias>

Image: http://68.media.tumblr.com/fc3e73cb816be60cdd8e8429072d1527/tumblr_oetl3933Cx1qa2l2po1_500.jpg

The presence of one review seems to attenuate discrimination on AirBnb. How would the number of reviews affect discrimination on the platform? Additionally, how would the ratio of review types (e.g., blank, non-positive, positive) affect discrimination?

To collect the reviews, the authors aggregated the geographical locations. How does the location of the hosts and guests affect discrimination? Are there differences in discrimination among specific regions of the country? How does discrimination differ across rural and urban areas?

Want to Know More?

Discrimination exists across other platforms besides Airbnb. For example, a working paper by Messias et al (2017) demonstrates how different demographic groups interact with each other using Twitter data. Among other things, they find white males are more likely to obtain greater popularity on Twitter. It is important to note that there are other forms of discrimination besides racial discrimination. For example, Ge et al (2016) demonstrate the existence of gender discrimination for ride sharing services using a randomized experiment.

For businesses, it is important to realize that personal biases (which sometimes play out as discrimination) can affect their customers' perceived service quality. For example, an Asian male may perceive a greater

service quality when another Asian male performs a service when compared to a white male. Ta et al. (2018) found that disclosing the identities of drivers for crowdsourced delivery increase levels of "customer trust, expected satisfaction, and repurchase intention" when the customer perceives similarity with the driver.

Foundational Classical Studies

This study intersects two main domains: discrimination and operational transparency. The authors use Arrow (1973) to situate their study theoretically in the discrimination literature. Arrow (1973) suggests the mechanism of discrimination is statistical – where discrimination is a result of imperfect information. The authors develop their hypotheses based on Arrow's arguments since this mechanism would suggest that additional information (in the form of reviews for AirBnb) could reduce discrimination. While the discrimination literature has been around for decades, the operational transparency literature is nascent so the classical studies the authors rely on are more recent. For example, they present Buell and Norton (2011), who demonstrated that operational transparency can increase customer's perceived value, to demonstrate how operational transparency can be beneficial to companies.

References

- Digital Exile: How I got banned for life from Airbnb – Medium <https://medium.com/@jacksoncunningham/digital-exile-how-i-got-banned-for-life-from-airbnb-615434c6eeba>
- Arrow, K. (1973). The theory of discrimination. *Discrimination in Labor Markets*, 3(10), 3-33.
- Foster, A. D., & Rosenzweig, M. R. (1995). Learning by doing and learning from others: human capital and technical change in agriculture. *Journal of Political Economy*, 103(6), 1176-1209.
- Li, J., Zhang, D., & Cui, R. (2017). A better way to fight discrimination in the sharing economy. *Harvard Business Review Online*.
- Ge, Y., Knittel, C. R., MacKenzie, D., & Zoepf, S. (2016). Racial and gender discrimination in Transportation Network Companies (No. w22776). National Bureau of Economic Research.
- Messias, J., Vikatos, P., & Benevenuto, F. (2017). White, man, and highly followed: Gender and race inequalities in Twitter. *arXiv preprint arXiv:1706.08619*.
- Ta, H., Esper, T. L., & Hofer, A. R. (2018). Designing crowdsourced delivery systems: The effect of driver disclosure and ethnic similarity. *Journal of Operations Management*.
- Buell, R. W., & Norton, M. I. (2011). The labor illusion: how operational transparency increases perceived value. *Management Science*, 57(9), 1564-1579.

BEHIND-THE-SCENES

INTERVIEW WITH PROF. RUOMENG CUI



How did you come up with this idea?

Inspired by Edelman et al. (2016) which shows discrimination exists on Airbnb, we wanted to find ways to reduce discrimination by using review information.

What was the biggest challenge in the research and revision?

Re-run two more rounds of field experiments on Airbnb.

What are the main remaining missing puzzles in this area of research?

Whether guests discriminate against hosts on Airbnb. Price discrimination behavior in the context of B2B marketplace.

If any, what is your subsequent, ongoing work in this area of research?

Wholesale Price Discrimination in Global Sourcing: Field Evidence from Alibaba, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3290336

ABOUT EDITORS

CO-EDITOR-IN-CHIEF



Seongkyoon Jeong

Seongkyoon Jeong is a PhD student at Arizona State University. Prior to joining his PhD program, he worked for the Korean government as a researcher, planning R&D programs and evaluating organizational performance. His research lies in product and innovation management in the supply chain context. He holds Bachelor and Master of Science from Seoul National University and Master of Management from Georgia Institute of Technology.



Seth Washispack

Seth Washispack is a PhD student in Supply Chain Management at Arizona State University. His current research interests include empirically grounded work in socially responsible supply chains and supply chain performance. Recently, he published an article focusing on sustainable supply chain management in the Journal of Business Logistics. He received both his bachelor's in Biomedical Engineering and his MBA from the University of Arkansas.

EDITOR



Xiangjing (Olivia) Chen

Xiangjing Chen is a PhD student in Supply Chain Management at the W.P. Carey School of business of Arizona State University (ASU). She received her bachelor's degrees in Economics, Accounting and Finance from Sichuan University in China and University of Minnesota respectively, and her master's degree in Business Analytics from ASU. Her currently research focuses on online retailing and pricing strategy. She also has research interests in supply chain risk management and logistics.

**M. Ryan Hatton**

Ryan Hatton is a PhD student in Supply Chain Management at Arizona State University. His current research interests include empirically grounded work in government purchasing operations and cooperative purchasing. Prior to joining the PhD program, he worked as Director of Technology for NASPO ValuePoint. He holds a Bachelor's degree in Economics from the University of California, Davis as well as an MBA from the University of Utah.

**Chao Wu**

Chao is a Ph.D. student in Arizona State University majoring in supply chain management. His current research interest is in mathematical modeling with humanitarian supply chain area. Chao has his master's in supply chain management from Washington University in St. Louis and bachelor's in both Economics and Accounting from Clarion University. He also worked in a leading Agri-science company for three and half years.

DIRECTED BY**Yimin Wang**

Yimin Wang is an associate professor in the W. P. Carey School of Business at Arizona State University. He joined ASU in 2007. His research areas include supply chain risk management, global operations and revenue management. Among his current projects are efforts that examine operational improvement to mitigate supply risks and mitigating regulatory trade barriers. Prior to ASU, he served as a consultant with the SAS Institute and as project leader for Canadian Airlines International.

SUBJECT INDEX

Analytical Research

- pg. 36** Acquire, Retain, and Provide Quality Service: Does a Firm Have to Choose How to Allocate between the Three?
- pg. 40** Which Project to Prioritize or Delay?
- pg. 96** In-Store, Online, or Both? New Product Quality Decisions
- pg. 100** Sharing Information with Farmers – How Will They Respond?
- pg. 124** The Best Structure for Replenishment Network: Suggestions for Micro-retailers in Developing Countries
- pg. 143** If You Know Your Customers May Regret It, How Should You Handle and Leverage Their Regret?
- pg. 147** Subscription or Per-Order: Profits and Environmental Impact of Online Grocery Shopping

Behavioral Operations

- pg. 44** Killing Two Birds with One Stone: Healthcare Cost and Quality
- pg. 118** Inventory and Sales – Scarcity or Variety Effect?
- pg. 137** Offline Showrooms for Online Sales
- pg. 140** Click Here to Buy and More!

Bio-medical Sector

- pg. 23** Is Competition Always Good?
- pg. 26** Actors in the Innovation Play: What's Their Motivation?
- pg. 44** Killing Two Birds with One Stone: Healthcare Cost and Quality

Business Analytics

- pg. 147** Subscription or Per-Order: Profits and Environmental Impact of Online Grocery Shopping

Corporate Social Responsibility

- pg. 100** Sharing Information with Farmers – How Will They Respond?

Emerging Economy

- pg. 108** $1+1>2?$ The Impact of Social Media Integration

Empirical Research

- pg. 13** The Dark Side of Competition: Customers Become More Difficult to Satisfy
- pg. 17** Combining Services and Products to Compete
- pg. 20** Increasing Productivity: Hire Someone at Another Firm?
- pg. 23** Is Competition Always Good?
- pg. 26** Actors in the Innovation Play: What's Their Motivation?
- pg. 33** To Locate, To Relocate, or To Reshore: No Matter How You Say It, Why Should It Be in a High Cost Country?
- pg. 44** Killing Two Birds with One Stone: Healthcare Cost and Quality
- pg. 47** Non-Profit Organizations' Funding: Where to Use the Money?
- pg. 54** Mixing Different Fulfillment Channels: Just What the Customer Wants!
- pg. 57** Timing Matters: The Effect of Time Gap between Service Events on Customer Responses
- pg. 61** Early and Late Six Sigma Adoptions
- pg. 65** Does Working Faster Reduce or Increase Cost? Both Can Happen
- pg. 104** How to Translate Integration into Higher Productivity
- pg. 108** $1+1>2?$ The Impact of Social Media Integration
- pg. 111** Government Stance – You're Interfering with Our Operations

- pg. 118** Inventory and Sales – Scarcity or Variety Effect?
- pg. 121** When Disaster Strikes: Use Recourse Inventory Allocation?
- pg. 127** Forecasting Similarly Unsimilar New Product Life Cycles
- pg. 134** Is Social Media a New Channel to Improve Operational Efficiency?
- pg. 137** Offline Showrooms for Online Sales
- pg. 140** Click Here to Buy and More!
- pg. 151** Birds of a Feather...Want to Ride with Drivers of the Same Feather?
- pg. 155** Decreasing Discrimination in the Sharing Economy

Financial Sector

- pg. 13** The Dark Side of Competition: Customers Become More Difficult to Satisfy

Humanitarian Operations

- pg. 111** Government Stance – You're Interfering with Our Operations
- pg. 121** When Disaster Strikes: Use Recourse Inventory Allocation?

Innovation Management

- pg. 20** Increasing Productivity: Hire Someone at Another Firm?
- pg. 26** Actors in the Innovation Play: What's Their Motivation?
- pg. 40** Which Project to Prioritize or Delay?
- pg. 108** 1+1>2? The Impact of Social Media Integration
- pg. 143** If You Know Your Customers May Regret It, How Should You Handle and Leverage Their Regret?

IT Sector

- pg. 20** Increasing Productivity: Hire Someone at Another Firm?
- pg. 134** Is Social Media a New Channel to Improve Operational Efficiency?
- pg. 140** Click Here to Buy and More!

Inventory Management

- pg. 54** Mixing Different Fulfillment Channels: Just What the Customer Wants!
- pg. 118** Inventory and Sales – Scarcity or Variety Effect?
- pg. 121** When Disaster Strikes: Use Recourse Inventory Allocation?
- pg. 124** The Best Structure for Replenishment Network: Suggestions for Micro-retailers in Developing Countries
- pg. 127** Forecasting Similarly Unsimilar New Product Life Cycles

Manufacturing Sector

- pg. 17** Combining Services and Products to Compete
- pg. 33** To Locate, To Relocate, or To Reshore: No Matter How You Say It, Why Should It Be in a High Cost Country?
- pg. 54** Mixing Different Fulfillment Channels: Just What the Customer Wants!
- pg. 61** Early and Late Six Sigma Adoptions
- pg. 65** Does Working Faster Reduce or Increase Cost? Both Can Happen
- pg. 118** Inventory and Sales – Scarcity or Variety Effect?
- pg. 127** Forecasting Similarly Unsimilar New Product Life Cycles
- pg. 143** If You Know Your Customers May Regret It, How Should You Handle and Leverage Their Regret?

Non-Profit Organization

- pg. 47** Non-Profit Organizations' Funding: Where to Use the Money?
- pg. 100** Sharing Information with Farmers – How Will They Respond?
- pg. 111** Government Stance – You're Interfering with Our Operations
- pg. 121** When Disaster Strikes: Use Recourse Inventory Allocation?

Production Management

- pg. 33** To Locate, To Relocate, or To Reshore: No Matter How You Say It, Why Should It Be in a High Cost Country?
- pg. 47** Non-Profit Organizations' Funding: Where to Use the Money?
- pg. 61** Early and Late Six Sigma Adoptions
- pg. 65** Does Working Faster Reduce or Increase Cost? Both Can Happen
- pg. 96** In-Store, Online, or Both? New Product Quality Decisions
- pg. 104** How to Translate Integration into Higher Productivity
- pg. 127** Forecasting Similarly Unsimilar New Product Life Cycles

Service Sector

- pg. 36** Acquire, Retain, and Provide Quality Service: Does a Firm Have to Choose How to Allocate between the Three?
- pg. 40** Which Project to Prioritize or Delay?
- pg. 57** Timing Matters: The Effect of Time Gap between Service Events on Customer Responses
- pg. 104** How to Translate Integration into Higher Productivity
- pg. 151** Birds of a Feather...Want to Ride with Drivers of the Same Feather?
- pg. 155** Decreasing Discrimination in the Sharing Economy

Retail Sector

- pg. 96** In-Store, Online, or Both? New Product Quality Decisions
- pg. 124** The Best Structure for Replenishment Network: Suggestions for Micro-retailers in Developing Countries
- pg. 137** Offline Showrooms for Online Sales
- pg. 147** Subscription or Per-Order: Profits and Environmental Impact of Online Grocery Shopping

Technology Management

- pg. 108** 1+1>2? The Impact of Social Media Integration
- pg. 134** Is Social Media a New Channel to Improve Operational Efficiency?

Service Management

- pg. 13** The Dark Side of Competition: Customers Become More Difficult to Satisfy
- pg. 17** Combining Services and Products to Compete
- pg. 23** Is Competition Always Good?
- pg. 36** Acquire, Retain, and Provide Quality Service: Does a Firm Have to Choose How to Allocate between the Three?
- pg. 57** Timing Matters: The Effect of Time Gap between Service Events on Customer Responses
- pg. 151** Birds of a Feather...Want to Ride with Drivers of the Same Feather?
- pg. 155** Decreasing Discrimination in the Sharing Economy