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## 20th Anniversary Article

# Twenty Years in the Making: The Evolution of the Journal of *Manufacturing & Service Operations Management*

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**Abstract.** Over the last 20 years, the journal *Manufacturing & Service Operations Management* (M&SOM) has expanded its original focus to include innovative operations, environmentally sustainable operations, and socially responsible operations. As we celebrate M&SOM's 20th anniversary, this special issue is intended to renew M&SOM's commitment to publish operations management research articles that are relevant, innovative, and rigorous. This paper reflects on the development of M&SOM over the last 20 years and discusses the exciting future of the journal.

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**Keywords:** operations management • OM research • historical perspective • research trends

## 1. Introduction

The journal *Manufacturing & Service Operations Management* (M&SOM) was inaugurated in 1999. The founding editor, Leroy Schwarz (Purdue University), took three years of hard work to publish the first issue in 1999 (Schwarz 1999). Since then, Garrett van Ryzin (Columbia University), Gerard Cachon (University of Pennsylvania), Stephen Graves (Massachusetts Institute of Technology), and Christopher Tang (University of California, Los Angeles) have followed in Schwarz's footsteps to continue an arduous journey with one common goal in mind: making M&SOM the premier journal for the operations management (OM) research community. Has M&SOM achieved this goal? There is no definitive answer because there are no well-accepted performance measures. However, it is gratifying to observe that over 50% of M&SOM articles have been written (or cowritten) by authors from the top 50 business schools (Tang 2016), and the number of paper submissions reached a new record in 2018 of over 540 submissions (Tang 2018). To a certain extent, these two measures represent the unwavering support of the OM research community.

Over the last 20 years, M&SOM has gone through many improvements, including online submissions, a general two-reviewer and two-round review process, online M&SOM review blogs, online blogs from the editor to facilitate communication, various special issues, practice-based research competition, and data-driven

research challenges (partnered with the Manufacturing & Service Operations Management (MSOM) society<sup>1</sup> and Cainiao, the logistics arm of Alibaba). All these changes were intended to improve *speed* (of the review process), maintain *quality* (in terms of relevance, novelty, and rigor), and encourage *variety* (in terms of research topics). The *Financial Times* has recognized these improvements by including M&SOM on its top 50 journals list since January 2017. Despite all these exciting changes, M&SOM's core mission remains the same: to publish relevant, rigorous, and innovative OM research articles.

The intent of this 20th anniversary special issue is to reflect on the past and look to the future. In this introductory article for this special issue, we first examine how M&SOM has changed over the years. Specifically, by analyzing the keywords of all articles published between 1999 and 2018, we first present our key finding: M&SOM has expanded its original focus in manufacturing and service operations to include innovative operations, environmentally sustainable operations, and socially responsible operations.

The expanding scope of M&SOM is a reflection of the change in research pursuits, and we hypothesize that the evolution of OM research topics over the last 20 years is a natural reaction to (1) economic forces, (2) social and environmental forces, and (3) technological forces. We conclude this introductory article with a list of articles written by a group of OM scholars.

Their perspectives represent a renewed commitment of *M&SOM* to publish relevant, innovative, and rigorous OM research articles so that *M&SOM* will continue to be the premier journal for the thriving OM research community. Ultimately, the future success of *M&SOM* relies on the unwavering support of the authors, reviewers, editorial board members, and our readers.

## 2. The Evolution of *M&SOM* Over the Last 20 Years

Let us examine the characteristics of all 655 articles (except errata, award announcements, calls for papers, etc.) published in *M&SOM* between 1999 (the inception year) and 2018. As reported in Table 1, these 655 articles were written by 1,641 authors (with 1,014 distinct authors) who were affiliated with institutions located in 30 different countries. The top 11 countries are shown in Table 2: authors affiliated with U.S. institutions account for 73.4%, and authors affiliated with Canadian institutions account for 5.7%.<sup>2</sup>

Figure 1 reports the number of papers published and submitted between 1999 and 2018. First, during its early years, *M&SOM* published slightly more than 20 papers per year, and the number of publications increased to over 40 papers per year. Also, although INFORMS was unable to locate the number of papers submitted before 2006, we learned that *M&SOM* received 100 paper submissions in 1999.<sup>3</sup> Since then, the number of submissions has increased over the years, and 2018 marked a new record with 555 submissions.

Second, to examine the research topics covered by different papers published in *M&SOM* between 1999 and 2018, we use those 3,073 keywords associated with those 655 papers to create a tag cloud (Figure 2). Essentially, the font size of each keyword indicates how frequently the corresponding topic appeared in the keywords listed in all papers. Specifically, the top three commonly used keywords were “supply chain management” (appeared 60 times), “pricing” (39), and “service operations” (33). Our finding is consistent with that of Calma et al. (2018).

To track how these commonly used keywords changed over the last 20 years, we first combine some keywords (e.g., we combine “queues” and “queuing” as queuing and “newsvendor” and “newsboy model”

**Table 2.** *M&SOM* Author Affiliation by Country

Country/region	Number of author affiliations
United States	1,218
Canada	94
Hong Kong SAR, China	58
China	50
Singapore	41
The Netherlands	36
France	27
United Kingdom	26
Germany	19
Turkey	15
India	13
Israel	13
Others	49
Total	1,659

as newsvendor) that deal with similar topics. Then we identify the following top 10 commonly used keywords/topics: inventory (141), supply chain management (129), pricing (84), queuing (68), contract (53), capacity (53), empirical research (43), retailing (41), service operations (38), and procurement/sourcing (37). Figure 3 depicts the trend of the top six keywords/topics over the last 20 years. Generally speaking, “inventory” (management) was the most popular topic from 1999 to 2008, but this topic was overtaken by supply chain management from 2008 to 2018. In fact, only one article published in 2018 contains inventory as one of the keywords. Also, “empirical research” was virtually nonexistent before 2006, but it has become more popular since the works of Fisher (2007) and Roth (2007). Terwiesch et al. (2019) provide an in-depth analysis of the trend in empirical research in OM over the last two decades. Specifically, as shown in Figure 4, the presence of published articles based on empirical and experimental analyses is on the rise, although the bulk of the papers published in *M&SOM* continued to be “analytical” in the sense that the underlying analysis is based on operations research or economic models.

## 3. Three Major Forces That Shape *M&SOM*

Figure 3 reveals that *M&SOM* has expanded its scope from its focus on manufacturing and service operations to include innovative operations that are enabled by new technologies and business models. In this section, we hypothesize three major forces (economic, social and environmental, and technological) that may have caused the field of OM research (especially the articles published in *M&SOM*) to change over time.

### 3.1. Economic Forces

In the early 1990s, the ongoing economic reform of China and the North American Free Trade Agreement (NAFTA) offered a golden opportunity for American firms to offshore or outsource their manufacturing

**Table 1.** Basic Profile of All Articles Published in *M&SOM* Between 1999 and 2018

Time period	1999–2018
Number of papers	655
Number of authors	1,641
Number of distinct authors	1,014
Number of distinct countries	30
Number of keywords	3,073
Number of distinct keywords	1,837

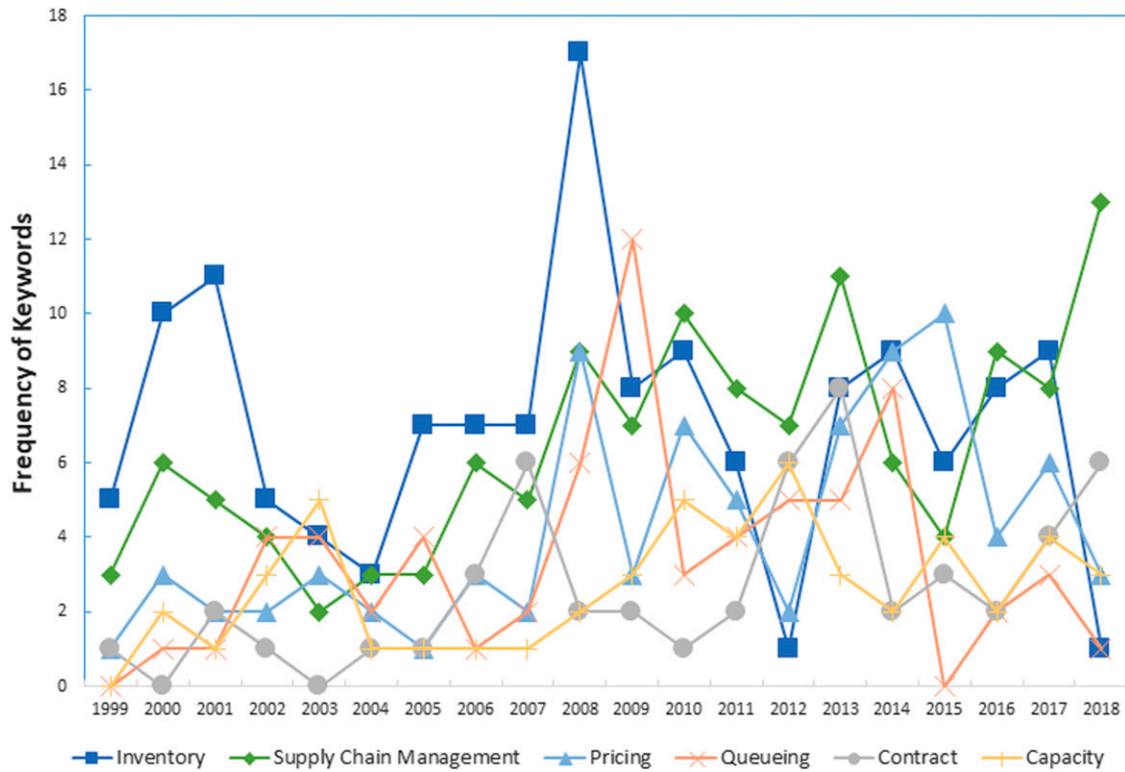
**Number of Papers Submitted and Published (1999-2018)**

Year	Number of Papers Submitted	Number of Papers Published
1999		10
2000		24
2001		25
2002		21
2003		21
2004		22
2005		21
2006	216	23
2007	233	33
2008	202	41
2009	240	41
2010	310	38
2011	371	35
2012	310	46
2013	298	47
2014	320	40
2015	426	41
2016	457	37
2017	432	42
2018	555	47

duties, and taxes into consideration (Cohen and Lee 1989, Huchzermeier and Cohen 1996).

As a consequence of outsourcing, most American firms became decentralized by the end of the 1990s. They focused on certain operations (design, marketing,



**Figure 3.** (Color online) Trend of the Top Six Commonly Used Keywords Between 1999 and 2018

and sales) and delegated other operations (sourcing, production, logistics, distribution, etc.) to third parties. Unlike the traditional centralized systems with full information and complete control of all involved units, decentralized systems are difficult to manage because different parties along the global supply chain belong to different companies, each of which has its own performance measure (self-interest). Consequently, different parties are reluctant to share their private information truthfully or cooperate unselfishly unless there are incentives to do so. Beginning in the mid-1990s, this fundamental difference created a new era for OM researchers to examine the implications of decentralized supply chains and develop incentive contracts to coordinate decentralized supply chains.

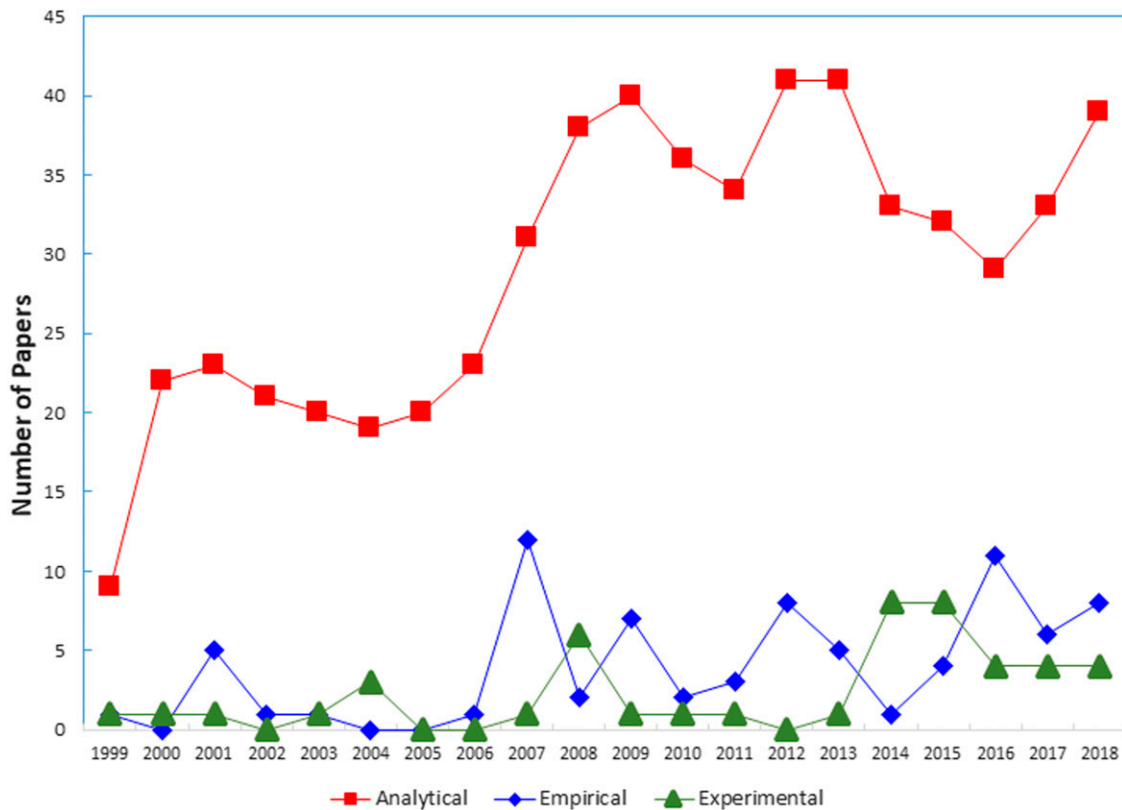
**3.1.1. Changes in OM Research: Supply Chain Management.** OM research in supply chain management began in the mid-1990s. Scopus<sup>5</sup> reported that there were 42 articles referencing supply chains in 1995, and this number increased to 378 by 2000 (Lariviere 2016). In one of the most cited OM research articles, Lee et al. (1997) illustrated an important pitfall of a decentralized system that is known as the “bullwhip effect”: a minor demand variability downstream can create a huge variability in the order quantity observed by each upstream partner. The bullwhip effect is caused by the fact that upstream partners have no visibility about downstream demand caused by

decentralization. To circumvent or reduce the bullwhip effect, Narayanan and Raman (2004) emphasized the importance of incentive alignment among different supply chain partners. To achieve incentive alignment, one party (principal) needs to offer an incentive contract to entice the other party (agent) to behave in the interest of the principal (or the entire supply chain). This observation has sparked the interest of many OM researchers to evaluate different types of supply chain contracts (Cachon 2003).

In addition to supply chain management that incorporates market uncertainties, risk management became an important supply chain issue after many firms experienced major supply chain disruptions caused by manmade or natural disasters (September 11, SARS, earthquake, etc.). The impact of many supply chain disruptions (e.g., Mattel’s toy recalls, Japan’s earthquakes, etc.) has motivated OM researchers to examine the issue of supply chain risks. Sodhi and Tang (2012) classified different types of supply chain risks and described different ways to mitigate those risks and respond to risk events.

As a result of outsourcing and offshoring, many governments in developed economies are exploring ways to protect against job loss to other developing countries. For example, the U.S. government replaced the NAFTA agreement with the new United States–Mexico–Canada Agreement (USMCA) in November 2018. Under the USMCA, there is a change in the

**Figure 4.** (Color online) Trend of Research Methodologies



“country of origin” rules: automobiles must have 75% of their components manufactured in the United States, Mexico, or Canada to qualify for zero tariffs (up from 62.5% under NAFTA). This change can affect the way that a firm should design its supply chain. Other than the USMCA, the ongoing trade negotiation between the United States and China and the pending Brexit deal can also create new opportunities for OM researchers to develop new supply chain structures that can exploit new trade agreements.

**3.1.2. Changes in OM Research: Service Operations.** As more American firms offshore or outsource their manufacturing operations overseas, the number of manufacturing jobs in the United States has dropped from 20 million in 1980 to less than 13 million in 2016. Also, the manufacturing sector contributed to just 11% of the value added to the U.S. gross domestic product in 2012, a significant decline from 25% in 1970 (Dai and Tayur 2017). Fortunately, the decline of the manufacturing sector was replaced by growth of the service sector. Specifically, telecommunication technologies spawned new businesses, such as telecommunication network equipment (e.g., Cisco) and ERP systems (e.g., Oracle) to support various innovative business-to-consumer business models such as direct sales (Dell) and online retailing (Amazon), consumer-

to-consumer business models (eBay), and various online businesses (banking, hotels, airlines, etc.). By the early 2000s, the United States had transitioned from a “manufacturing-based economy” to a “service-based economy” (Karmarkar 2015). Worstall (2016) reported that despite the fact that the United States lost 7 million manufacturing jobs, it has created 33 million jobs in the service sector (retail, healthcare, education, financial services, consulting, etc.) since 1980. By 2017, healthcare became the largest sector, employing 16 million people in the United States and surpassing the retail and manufacturing sectors. Despite the high cost of healthcare in the United States, the healthcare system remained inefficient. With the increasing use of information technology, Green (2012) argued that there is a golden opportunity for OM researchers to examine ways to improve healthcare operations to achieve better outcomes at lower cost.

Recall from Table 2 that 73.4% of all authors were affiliated with U.S. institutions. Therefore, it is natural to expect that these authors would focus on topics that are influenced by the economic forces faced by U.S. corporations. Hence, as the United States has shifted its strategy from vertical integration to decentralization since the 1990s, OM researchers have followed this trend to embark on research in the area of supply chain management and/or supply chain risk

management. This trend is reflected in Figure 3, which shows that supply chain management has become one of the most popular topics in *M&SOM*. At the same time, as the United States transitioned to become a service-based economy, it is no surprise that service operations have become a popular topic of articles published in *M&SOM*. Some key examples include (1) call center operations (Gans et al. 2003), (2) retail operations (DeHoratius and Raman 2007, Craig et al. 2016), and (3) healthcare operations (Green 2012, Xu and Chan 2016).

### 3.2. Social and Environmental Forces

Since the early 2000s, two major forces have pressured firms to pay attention to the triple bottom line: profit, people, and planet (Elkington 2002).<sup>6</sup> First, the rapid global economic development in China and India led to a drastic increase in demand for natural resources (clean water, crude oil, wood, metals, etc.). The demand for Earth's resources continues to grow because of population growth, longevity (resulting from better healthcare), and increasing consumption (caused by economic development in developing countries, such as China and India). At the same time, the supply of Earth's resources continues to shrink because of reduced access to arable land (which has shrunk by one-third since 1975), water (usage of which has grown twice as fast as the population in the last century), and fossil fuels (which models predict could be used up in 30–100 years depending on the type; Gerland et al. 2014, Cameron et al. 2015). On top of all of this, greenhouse gas emissions have been considered a leading cause of climate change, which can cause major disruptions and devastation. For these reasons, the general public is increasingly concerned about “environmental sustainability.”

Second, as more firms offshored or outsourced their production to emerging and developing economies, the treatment of the labor force, the safety of the work environment, and the well-being of communities have not been properly regulated. Consequently, environmental health and safety have become new concerns for global companies and their end consumers (Caro et al. 2018). With stagnant growth in developed countries since the recession in 2008, global companies producing fast-moving consumer goods, such as Unilever and Procter & Gamble, and food and beverage companies, such as Coca Cola, Nestle, and Starbucks, are expanding their markets to developing economies (Prahalad 2004). To develop emerging markets, these companies need to help the poor break out of the poverty cycle so that they can afford to purchase their products (Karnani 2007). The need to strengthen developing economies as supply bases and new demand sources is a key driver for companies to engage in “social responsibility.”

#### 3.2.1. Changes in OM Research: Environmental Sustainability.

Supply chain processes affect environmental sustainability directly because the process involves planning, sourcing, production, and delivery. At the strategic level, Kleindorfer et al. (2005) argued that sustainability can offer a firm an opportunity to gain the first-mover advantage (e.g., Toyota's Prius hybrid technology) and improve a company's image (e.g., Patagonia's declaration as a “benefit corporation”) so that it can improve its profitability by demanding a higher volume at a higher price. From the operational perspective, Drake and Spinler (2013) commented that by incorporating the notion of sustainability, OM researchers can explore new topics, including product design (e.g., Agrawal and Ulku 2013), technology choice (e.g., Plambeck 2013), forward supply chain (e.g., Caro et al. 2013), and closed-loop supply chain (e.g., Guide and Van Wassenhove 2009, Ferguson and Souza 2010). More recently, a circular economy movement has been developed by the Ellen MacArthur Foundation in Europe that aims to create business models for improving environmental sustainability. Agrawal et al. (2019) articulated three elements of the circular economy movement and proposed new OM research opportunities. These three elements are (1) reverse flows (there is a need to develop better processes to increase returns, repair, refurbish, recycling, and remanufacturing), (2) circular design (there is a need to develop new product designs that can improve durability [i.e., to reduce], repairability [i.e., to reuse], and recyclability [i.e., to recycle]), and (3) circular business model (there is a need to create new business models [e.g., leasing, renting, and sharing] to reduce, reuse, or recycle).

#### 3.2.2. Changes in OM Research: Social Responsibility.

As companies venture into developing markets as buyers of raw materials, products, and services, Lee and Tang (2017) argued that unethical and socially irresponsible acts committed by various suppliers or contract manufacturers in developing countries can create disruption and reputation risks for these companies even without legal liability. Because many of these unethical acts tend to occur at one of the upstream supply chain partners located in developing countries, there is a need for global companies to develop strategies to create reward and penalty incentives as well as inspection and monitoring mechanisms to make these upstream supply chain partners more socially responsible. Babich and Tang (2012) evaluated the effectiveness of deferred payments and inspection for managing product adulteration. In the context of environmental violations, Lo et al. (2018) established empirical evidence about the negative stock market reaction to publicly listed Chinese manufacturers that violated environmental regulations.

Finally, motivated by the Accord on Fire and Building Safety in Bangladesh that was established in 2013 after the collapse of Rana Plaza, Caro et al. (2018) showed that the joint audit imposed by the Accord members is an effective mechanism to entice factory owners to comply with building and safety regulations.

In summary, relative to well-established areas, such as manufacturing and service operations, environmental sustainability is an emerging research area in *M&SOM*. However, we expect that sustainable operations management will be a mainstay OM research topic as more companies (e.g., HP, Cisco, H&M, Nike, etc.) integrate sustainability into their business models and form partnerships with the Ellen MacArthur Foundation to adopt and promote a circular economy. In the same vein, social responsibility is also an emerging OM research topic. Although only a few articles on this topic have been published in *M&SOM* in recent years (Lee and Tang 2017), we observe an increased interest among OM researchers based on the number of submissions to an *M&SOM* special issue on responsible operations in 2017.

### 3.3. Technological Forces

Personal computers have become more affordable since the mid-1990s, and the advent of the internet has created easy information access. These two developments enabled the creation of a new economy based on information technology that was started in the mid-1990s. The first creation was e-commerce (e.g., Amazon, eBay, Netflix, Alibaba, etc.), which trades goods or services online.<sup>7</sup> Then, as mobile technology and mobile payment systems became more accessible in both developed and developing countries, it created new startups (e.g., mobile finance and online platforms, such as Uber<sup>8</sup>) based on mobile phones since the mid-2000s as well as new projects (e.g., cryptocurrencies, smart contracts, etc.) motivated by the recent hype about Blockchain technology (Babich and Hilary 2019). Although the advancement of information and communication technologies changed the business landscape, it has generated a fundamental shift in OM research as well.

**3.3.1. Changes in OM Research: e-Commerce and New Retailing.** To serve customers anytime and anywhere and avoid the costs associated with physical retail space and sales staff, online retailers keep their inventory in centralized warehouses instead of individual stores. Through “demand pooling,” online retailers can afford to carry a much wider assortment, including those long-tail products. This new capability generated new OM research issues related to dynamic assortment planning (Caro and Gallien 2007), customized assortment recommendations to individual online shoppers (Cachon et al. 2005), and

dynamic personalized pricing (Bitran and Caldentey 2003, Choudhary et al. 2005, Aviv and Pazgal 2008, Lei et al. 2019). To fight against the encroachment of various e-commerce companies, traditional incumbent firms (airlines, retailers, such as Macy’s, Barnes and Noble, etc.) needed to decide whether to launch their own online services to compete (Bernstein et al. 2008). However, when a firm operates both online and offline channels, there are various operational issues that deserve our attention. Gao and Su (2016) examined how a firm should leverage online and offline demand information to improve inventory planning and pricing decisions. Also, when selling in both online and offline channels, a firm needs to develop an efficient way to manage different purchasing behaviors, including buying online and picking up in store and/or showrooming (i.e., try in store and order online).

**3.3.2. Changes in OM Research: Sharing Economy and Online Platforms.** e-Commerce has certainly disrupted traditional business models. There are winners (e.g., Netflix displaced Blockbuster in 2013) and losers (e.g., online grocer Webvan filed bankruptcy in 2001 after three years of operation). Also, despite online stores offering 24/7 services without physical retail space, profitability remains a challenge: Amazon turned profitable for the first time in 2003 after nine years of operation. As it turns out, the inventory costs, customer acquisition and retention costs, and delivery costs to individual customers can be very high. At the same time, the success of Alibaba’s online platform business model (e.g., its business-to-business platform that connects buyers and suppliers and its Tmall marketplace that connects third-party sellers and buyers) has motivated others to develop online platforms for other services.<sup>9</sup> Online platforms create value for user groups via various efficient search and match mechanisms and generate revenue from each user group as well as online advertisements. Consequently, the underlying network effects and the asset-light business model enable online platforms to scale up their operations without incurring huge investments. The disruptive business models associated with various online platforms—(Uber [ride sharing], Airbnb [home sharing], InnoCentive [crowdsourcing], Kickstarter [crowdfunding], and e-Harmony [online dating])—create a golden opportunity for OM researchers to explore. For example, in the context of on-demand ridesharing platforms, such as Uber, Lyft, or Didi, Cachon et al. (2019) examined the benefit of surge pricing, and Bai et al. (2019) evaluated the effectiveness of the fixed payout ratio that Didi drivers receive from the platform. An online crowdsourcing platform (e.g., InnoCentive) organizes and administers contests on behalf of “seekers” to elicit solutions



from a group of highly qualified solvers. Associated with crowdsourcing platforms, there are many OM research issues to explore, including (1) the format of the contest (e.g., open to all solvers or restricts entry; Terwiesch and Xu 2008, Ales et al. 2018), (2) the award scheme (Ales et al. 2017), and (3) the rules of engagement (e.g., component-wise [sequential] contests versus one comprehensive [simultaneous] contest; Hu and Wang 2017). For a review of recent research on online platforms, please refer to Chen et al. (2019) for details.

**3.3.3. Changes in OM Research: Industry 4.0.** The term “Industry 4.0” originated from a German government project that promoted the computerization of manufacturing and was revived at the Hannover Fair in Germany in 2011. Essentially, Industry 4.0 combines different automation technologies (autonomous robotics, three-dimensional printers, autonomous vehicles, drones, industrial internet of things, etc.) and digital technologies (cloud computing, data analytics, etc.) to create a “smart factory.” Under smart manufacturing, different physical units and humans across the entire supply chain can communicate and cooperate with each other in real time. Currently, many manufacturing firms are facing formidable challenges in the adoption of different new (automation and digital) technologies for developing smart factories. This new trend creates exciting research opportunities for

OM researchers. For example, some open research questions deserve our attention. What is the economic value of Industry 4.0? Which manufacturing sector can benefit the most from the implementation of Industry 4.0? How would Industry 4.0 affect materials, information, and financial flows along a supply chain?

To conclude, by leveraging internet and mobile technologies, e-commerce and online platforms use new business models to disrupt traditional business models. Also, the new trend in Industry 4.0 can create new business models, but there is fear that it may destroy jobs for workers. These new technological capabilities offer golden opportunities for OM researchers to evaluate different new business models. Although online platforms are a relatively new research area, *M&SOM* launched a special issue on the sharing economy and online platforms in 2018.

In this section, we have used three major forces (economic, social and environmental, and technological) to provide a plausible cause for the shift of OM research topics in the past (from manufacturing to supply chain/service operations) as observed in Figure 3 and hypothesize environmental sustainability/social responsibility and online platforms as emerging OM research topics in the future. Also, in terms of research methodologies, we expect that more articles will include some data collected from real transactions or generated from laboratory experiments as data become more accessible. Consequently, OM researchers

**Table 3.** Contributors to the 20th Anniversary *M&SOM* Special Issue

Topic	Contributors
Personal reflection of <i>M&amp;SOM</i>	Leroy Schwarz (Purdue)
Inventory and capacity management	Jing-Sheng Song (Duke), Geert-Jan van Houtum (Eindhoven), and Jan Van Mieghem (Northwestern)
Global supply chain management and risk management	Morris Cohen (Wharton) and Hau Lee (Stanford); Lingxiu Dong and Panos Kouvelis (Washington University in St. Louis)
Healthcare operations	Diwas KC (Emory), Stefan Scholtes (Cambridge), and Christian Terwiesch (Wharton); Pinar Keskinocak (Georgia Tech) and Nicos Savva (London Business School)
Innovative products and services	Stelios Kavadias (Cambridge) and Karl Ulrich (Wharton)
Innovative operations	Gerard Cachon (Wharton) and Serguei Netessine (Wharton)
Environmental sustainability	Atalay Atasu (Georgia Tech), Charles Corbett (University of California, Los Angeles), and Beril Toktay (Georgia Tech)
Social responsibility	Erica Plambeck (Stanford) and Kamalini Ramdas (London Business School)
Humanitarian operations	Maria Besiou (KLU) and Luk Van Wassenhove (INSEAD)
Smart operations	Sameer Hajisa (INSEAD), Max Shen (Berkeley), and Chung Piaw Teo (NUS); Victor Martínez de Albéniz (IESE), Felipe Caro (University of California, Los Angeles), and Gurhan Kok (Koc)
Industry 4.0	Tava Olsen (Auckland) and Brian Tomlin (Tuck); Gad Alon (Wharton) and Vlad Babich (Georgetown)
Sharing economy and online platforms	Saif Benjaafar (Minnesota) and Ming Hu (Toronto)
Empirical OM	Eve Rosenweig (Emory) and Aleda Roth (Clemson); Marshall Fisher (Wharton), Marcelo Olivares (University of Chile), and Bradley Staats (University of North Carolina, Chapel Hill)
OM business analytics	Velibor Misis (University of California, Los Angeles) and Georgia Perakis (Massachusetts Institute of Technology)
Behavioral OM research	Karen Donohue (Minnesota), Özalp Özer (University of Texas, Dallas), and Karen Zheng (Massachusetts Institute of Technology)

can develop new insights by leveraging different research methods in the future.

#### 4. Special Issue: A Renewed Commitment

As *M&SOM* reaches a 20-year milestone, it presents an opportunity to reflect on the past and look to the future. In this special issue, OM scholars (Table 3) offer their perspectives on a wide range of OM research topics. Collectively, they provide us with a glimpse of the future of OM research. More important, their perspectives reflect a renewed commitment of *M&SOM*: to publish relevant, rigorous, and innovative OM research articles. With the support of the OM research community, *M&SOM* will continue to thrive!

#### Acknowledgments

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#### Endnotes

<sup>1</sup> To serve the varied interests of different OM researchers, the MSOM Society was officially formed from a merger of the ORSA's Technical Section on Manufacturing Management and the TIMS College on Production and Operations Management in 1995. Michael Magazine was the first official president of the MSOM Society and served from 1995 to 1996, and many leading OM scholars have served as presidents since. The reader is referred to Olsen (2010) for an excellent description of the history of the MSOM Society. By 2018, the MSOM Society had over 1,800 active members. Also, the MSOM Society has created five special interest groups: healthcare operations management; interface of finance, operations and risk management; service management; supply chain management; and sustainable operations. These five groups also represent the research interests of our OM research community over time.

<sup>2</sup> Because some authors have two affiliations located in different countries, the total number of author affiliations shown in Table 2 (i.e., 1,659) is greater than the number of authors shown in Table 1 (i.e., 1,641).

<sup>3</sup> According to the 2000 MSOM Conference meeting minutes, Anant Iyer reported on behalf of Lee Schwarz (the founding editor of *M&SOM*) that *M&SOM* received 100 new submissions during 1999.

<sup>4</sup> For example, China opened up various Special Economic Zones (Pudong [Shanghai], Shenzhen, etc.) that offered tax benefits to attract foreign direct investment.

<sup>5</sup> Scopus is Elsevier's abstract and citation database that covers 34,346 peer-reviewed journals in many subject areas.

<sup>6</sup> In 2000, the United Nations established eight millennium development goals that include eradicating extreme poverty and ensuring environmental sustainability.

<sup>7</sup> Amazon was founded in 1994 as an online bookstore to compete with brick and mortar bookstores, such as Barnes and Noble and Borders; eBay was founded in 1995 to facilitate consumer-to-consumer commerce; Netflix was founded in 1997 as an online DVD rental company to compete with Blockbuster; and Alibaba was founded in 1999 as a business-to-business portal that connects suppliers and buyers online.

<sup>8</sup> M-Pesa was launched in 2007 as a mobile phone-based money transfer in Kenya; Uber was launched in 2009 as a peer-to-peer ride-sharing platform.

<sup>9</sup> We define online platforms as digital marketplaces that enable different user groups to transact (i.e., search and match) effectively and efficiently without owning inventory of goods or contents. By 2018, 7 of the 10 most valuable venture-backed private companies were online platforms: Uber (\$72 billion), Didi-Chuxing (\$56 billion), Airbnb (\$31 billion), Meituan-Dianping (\$30 billion), WeWork (\$20.2 billion), Lufax (\$18.5 billion), and Lyft (\$15.1 billion).

#### References

- Agrawal V, Ulku S (2013) The role of modular upgradability as a green design strategy. *Manufacturing Service Oper. Management* 15(4):640–648.
- Agrawal V, Atasu A, Van Wassenhove LN (2019) New opportunities for operations management research in sustainability. *Manufacturing Service Oper. Management* 21(1):1–12.
- Ales L, Cho S-H, Körpeoğlu E (2017) Optimal award scheme in innovation tournaments. *Oper. Res.* 65(3):693–702.
- Ales L, Cho S-H, Körpeoğlu E (2018) Innovation tournaments with multiple contributors. Working paper, Carnegie Mellon University, Pittsburgh.
- Aviv Y, Pazgal A (2008) Optimal pricing of seasonal products in the presence of forward-looking consumers. *Manufacturing Service Oper. Management* 10(3):339–359.
- Babich V, Hilary G (2019) Blockchain and other distributed ledger technologies in operations. *Manufacturing Service Oper. Management*. Forthcoming.
- Babich V, Tang CS (2012) Managing opportunistic supplier product adulteration. *Manufacturing Service Oper. Management* 14(2):301–314.
- Bai J, So KC, Tang CS, Chen X, Wang H (2019) Coordinating supply and demand on an on-demand service platform: Price, wage, and payout ratio. *Manufacturing Service Oper. Management*, ePub ahead of print June 28, <https://doi.org/10.1287/msom.2018.0707>.
- Bernstein F, Song JS, Zheng X (2008) Bricks-and-mortar vs. clicks-and-mortar: An equilibrium analysis. *Eur. J. Oper. Res.* 187(3):671–690.
- Bitran G, Caldentey R (2003) An overview of pricing models for revenue management. *Manufacturing Service Oper. Management* 5(3):197–210.
- Cachon G, Daniels KM, Lobel R (2019) The role of surge pricing on a service platform with self-scheduling capacity. *Manufacturing Service Oper. Management* 19(3):368–384.
- Cachon G, Terwiesch C, Xu Y (2005) Retail assortment planning in the presence of consumer search. *Manufacturing Service Oper. Management* 7(4):330–346.
- Cachon GP (2003) Supply chain coordination with contracts. Graves SC, de Kok AG, eds. *Supply Chain Management: Design, Coordination and Operation*, Handbooks in Operations Research and Management Science, vol. 11 (Elsevier Science, Amsterdam), 227–339.
- Calma A, Ho W, Shao L (2018) *Manufacturing & Service Operations Management Journal: Impact, trends and future directions*. *M&SOM* blogs. Accessed December 26, 2018, <https://www.informs.org/Blogs/M-SOM-Blogs/From-M-SOM-Journal-Editor/Manufacturing-Service-Operations-Management-Journal-Impact-Trends-and-Future-Directions>.
- Cameron D, Osborne C, Horton P, Sinclair M (2015) A sustainable model for intensive agriculture. Report, University of Sheffield, Sheffield, UK.
- Caro F, Gallien J (2007) Dynamic assortment with demand learning for seasonal consumer goods. *Management Sci.* 53(2):276–292.

- Caro F, Chintapalli P, Rajaram K, Tang CS (2018) Improving supplier compliance through joint and shared audits with collective penalty. *Manufacturing Service Oper. Management* 20(2):363–380.
- Caro F, Corbett C, Tan T, Zuidwijk R (2013) Double counting in supply chain carbon footprinting. *Manufacturing Service Oper. Management* 15(4):545–558.
- Chen YJ, Dai T, Korpeoglu C, Körpeoglu E, Sahin O, Tang CS, Xiao S (2019) Innovative online platforms: Research opportunities. *Manufacturing Service Oper. Management*. Forthcoming.
- Choudhary V, Ghose A, Mukhopadhyay T, Rajan U (2005) Personalized pricing and quality differentiation. *Management Sci.* 51(7):1120–1130.
- Cohen MA, Lee HL (1989) Resource deployment analysis of global manufacturing and distribution network. *J. Manufacturing Oper. Management* 2(2):81–104.
- Craig N, DeHoratius N, Raman A (2016) The impact of supplier inventory service level on retailer demand. *Manufacturing Service Oper. Management* 18(4):461–474.
- Dai T, Tayur S (2017) The evolutionary trends of POM research in manufacturing. Starr M, Gupta S, eds. *Routledge Companion to Production and Operations Management* (Routledge, London), 647–662.
- DeHoratius N, Raman A (2007) Store manager incentive design and retail performance: An exploratory investigation. *Manufacturing Service Oper. Management* 9(4):518–534.
- Drake D, Spinler S (2013) Sustainable operations management: An enduring stream or a passing fancy? *Manufacturing Service Oper. Management* 15(4):698–700.
- Elkington J (2002) *Cannibals with Forks: The Triple Bottom Line of the 21st Century* (Oxford University Press, Oxford, UK).
- Ferguson M, Souza G (2010) *Closed-loop Supply Chains* (CRC Press, Boca Raton, FL).
- Fisher M (2007) Strengthening the empirical base of operations management. *Manufacturing Service Oper. Management* 9(4):368–382.
- Gans N, Koole G, Mandelbaum A (2003) Telephone call centers: Tutorial, review, and research prospects. *Manufacturing Service Oper. Management* 5(2):79–141.
- Gao F, Su X (2016) Online and offline information for omnichannel retailing. *Manufacturing Service Oper. Management* 19(1):84–98.
- Gerland P, Raftery AE, Ševčíková H, Li N, Gu D, Spoorenberg T, Alkema L, Fosdick BK, Chunn J, Lalic N, et al. (2014) World population stabilization unlikely this century. *Science* 346(6206):234–237.
- Green L (2012) The vital role of operations analysis in improving healthcare delivery. *Manufacturing Service Oper. Management* 14(4):488–494.
- Guide D, Van Wassenhove L (2009) The evolution of closed-loop supply chain research. *Oper. Res.* 57(1):10–18.
- Hu M, Wang L (2017) Joint vs. separate crowdsourcing contests. Working paper, University of Toronto, Toronto.
- Huchzermeier A, Cohen MA (1996) Valuing operational flexibility under exchange rate risk. *Oper. Res.* 44(1):100–113.
- Karmarkar U (2015) The service and information economy: Research opportunities. *Manufacturing Service Oper. Management* 17(2):136–141.
- Karnani A (2007) The mirage of marketing to the bottom of the pyramid: How the private sector can help alleviate poverty. *California Management Rev.* 49(4):90–111.
- Kleindorfer P, Singhal K, Van Wassenhove LN (2005) Sustainable operations management. *Production Oper. Management* 14(4):482–492.
- Lariviere M (2016) Supply chain contracting: Doughnuts to bubbles. *Manufacturing Service Oper. Management* 18(3):309–313.
- Lee HL, Tang CS (2017) Socially and environmentally responsible value chain innovations: New operations management research opportunities. *Management Sci.* 64(3):983–996.
- Lee HL, Padmanabhan V, Whang S (1997) Information distortion in a supply chain: The bullwhip effect. *Management Sci.* 43(4):546–558.
- Lei Y, Jasin S, Sinha A (2019) Joint dynamic pricing and order fulfillment for e-commerce retailers. *Manufacturing Service Oper. Management* 20(2):269–284.
- Lo CKY, Tang CS, Zhou Y, Yeung ACL, Fan D (2018) Environmental incidents and the market value of firms: An empirical investigation in the Chinese context. *Manufacturing Service Oper. Management* 20(3):422–439.
- Narayanan VG, Raman A (2004) Aligning incentives in supply chains. *Harvard Bus. Rev.* 82(11):94–103.
- Olsen T (2010) The manufacturing and service operations management society. Cochran JJ, ed. *Wiley Encyclopedia of Operations Research and Management Science* (John Wiley & Sons, Inc., New York).
- Plambeck E (2013) Operations management challenges for some “cleantech” firms. *Manufacturing Service Oper. Management* 15(4):527–536.
- Prahalad CK (2004) *Fortune at the Bottom of the Pyramid: Eradicating Poverty Through Profits* (Wharton School Publishing, Philadelphia).
- Roth A (2007) Applications of empirical science in manufacturing and service operations. *Manufacturing Service Oper. Management* 9(4):351–367.
- Schwarz L (1999) *Manufacturing & Service Operations Management: An introduction*. *Manufacturing Service Oper. Management* 1(1):v–vi.
- Sodhi MS, Tang CS (2012) *Managing Supply Chain Risks* (Springer Publishers, New York).
- Tang CS (2016) M&SOM is embraced by top OM researchers. M&SOM blogs. Accessed December 26, 2018, <https://www.informs.org/Blogs/M-SOM-Blogs/From-M-SOM-Journal-Editor/M-SOM-is-embraced-by-top-OM-researchers>.
- Tang CS (2018) M&SOM reaches new heights. M&SOM blogs. Accessed December 26, 2018, <https://www.informs.org/Blogs/M-SOM-Blogs/From-M-SOM-Journal-Editor/M-SOM-Reaches-New-Heights-A-Year-in-Review>.
- Terwiesch C, Xu Y (2008) Innovation contests, open innovation, and multiagent problem solving. *Management Sci.* 54(9):1529–1543.
- Terwiesch C, Marcelo O, Staats B, Gaur V (2019) A review of empirical operations management over the last two decades. *Manufacturing Service Oper. Management* 50(1):8–14.
- Worstell T (2016) The U.S. lost 7 million manufacturing jobs—and added 33 million higher-paying service jobs. *Forbes* (October 19), <https://www.forbes.com/sites/timworstell/2016/10/19/the-us-lost-7-million-manufacturing-jobs-and-added-33-million-higher-paying-service-jobs/#25b1eb394a20>.
- Xu K, Chan CW (2016) Using future information to reduce waiting times in the emergency department via diversion. *Manufacturing Service Oper. Management* 18(3):314–331.