

**Theory Usage in Empirical Operations Management Research:  
A Review and Discussion**

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### Abstract

**Purpose** – This study analyzes more than three decades of theory testing published in leading operations management (OM) journals.

**Design/methodology/approach** – This piece examines the amount of theory testing, the extent to which theories are tested multiple times, and the disciplinary origins of the theories that are tested.

**Findings** – The analysis revealed that empirical OM researchers have increasingly responded to demands for more theory-driven knowledge over time. OM researchers are developing and using a wide array of domestic theories to understand empirical data. The examination also revealed a substantial focus on theory borrowed from other scientific fields.

**Originality/value** – The findings here suggest that OM is clearly a maturing discipline. As the discipline matures, it is important to consider to what extent borrowed theories and frameworks can offer value to OM. A preliminary vetting model is advanced in order to critically assess foreign theory. It is hoped that future screening promotes only the most useful non-domestic theory, thereby ensuring sufficient journal space for domestic theory and resulting in effective solutions to the pressing, practical problems of the OM field.

### 1. Introduction

...I believe that OM researchers must turn to *theory-driven empirical research*. This emphasis on theory is critical if OM is to continue evolving into a field of scientific investigation. (Robert Handfield, past editor of the Journal of Operations Management, in Meredith et al. 2002, p. 12-13)

Initially, the operations management (OM) discipline was built upon the ‘scientific management’ principles of Frederick Taylor, Lilian and Frank Gilbreth, and Henry Gantt. The high volume standardized production methods of Henry Ford were also influential in the field (Davis et al. 2007). Until the middle of the 20th century, the nature of the discipline was characterized as highly descriptive in nature (Krajewski 2002), leading to criticisms over scientific methodology and

relevancy. The discipline overcame the first criticism in the 1960s through the introduction of Management Science / Operations Research (Krajewski 2002). The new line of thinking offered the discipline a scientific methodology that strengthened approaches to research problems and created new research topics (Buffa 1980). In the 1980s, the discipline began to overcome the second criticism by shifting research toward an understanding of the relevancy of OM issues across an entire enterprise (Krajewski 2002). The change involved an emphasis on different problems and a turn towards empirical research. Today, OM is viewed as having a strong core that interfaces with a number of disciplines (Voss 1995; Silver 2004; Sousa and Voss 2008).

The discipline's aforementioned turning points and related adjustments have led to numerous conceptual and empirical pieces that characterize the nature and evolution of the OM discipline. Pilkington & Liston-Heyes (1999) and Pilkington and Meredith (2009) have investigated the intellectual structure of the discipline. Drejer et al. (2000) examined the convergence and divergence of OM research in Scandinavia, the US, and the UK. Denizel et al. (2003) completed a historical comparative investigation of publicly available knowledge production in the field. Fuller and Mansour (2003) compared the fields of OM and operations research (OR). Pannirselvam et al. (1999) reviewed OM research methodologies and output. Smith et al. (2008) researched the institutional factors that affect the productivity of individuals in OM. Craighead and Meredith (2008) examined changes in research frameworks, from rational to existential, and sources of data. Hsieh and Chang (2009) explored OM researcher productivity. Linderman and Chandrasekaran (2010) investigated the exchange of ideas within Operations Management journals and between other management disciplines. Barratt et al. (2011) reviewed the nature of qualitative case studies in the discipline. de-Margerie and Jiang (2011) explored practitioners'

opinions about the managerial relevance of OM research. Barman et al. (1991), Goh et al. (1996), Barman et al. (2001), Theoharakis et al. (2007), Petersen et al. (2011), Meredith et al. (2011), Stonebraker et al. (2012) and Fry and Donohue (2013) have examined OM journals rankings.

An area that remains largely unexplored is the nature and extent of theory use in empirical OM research. Such work is deemed highly relevant to OM given its relationships to other theory-driven management disciplines such as marketing, management of information systems, and strategic management, in addition to the field of economics. It offers new and important insights that address the evolution, research methodology and maturity of the OM discipline. This study reveals the progress toward explicit theory-driven research in the discipline, a practice encouraged by Melnyk and Handfield (1998), Handfield (Meredith et al., 2002), Meredith and McMullen (2008), Holmström and Romme (2012) and Soltani et al. (2014). Handfield (in Meredith et al. 2002, p. 13-14, brackets added) states that:

...much of the research during this period (1990-2001) was devoid of a basis in theory... Clearly, this meant that the data was driving the theory, and not the other way around...a well-developed theoretical argument should in effect drive the research design of an empirical study, and the data then supports or fails to support the theory. This in turn drives the research agenda in a different direction, depending on the nature of the results.

The investigation here also reveals the most tested theories in the OM discipline. It sheds light on the intensity of theory importing or borrowing (Amundson 1989; Handfield in Meredith et al. 2002; MacCarthy et al. 2013; Halldorsson et al. 2015), as well as the origins of the foreign theories. Overall, the research offers insight into the scientific maturity of the OM discipline.

## **2. Examining theory-driven research across the social sciences**

The extent and nature of explicit theory-driven research has been investigated in a number of social science disciplines including management; strategic management; marketing; consumer behavior; supply chain management; clinical psychology; communication; gerontology; and, family science. In management, Colquitt & Zapata-Phelan (2007) reviewed 667 empirical articles from 16 volumes of *Academy of Management Journal* covering the time frame 1963 to 2007. The authors found a steady, upward trend in theory-driven empirical research. In organization and management theory (OMT), Oswick et al. (2011, p. 319) assessed the extent of theory borrowing, which they defined as, "...the importation of coherent and fully formed ideas that explain a phenomenon (or phenomena) into OMT from outside the discipline." The analysis revealed that nearly two-thirds of OMT research is driven by theories borrowed from other disciplines – obvious fields such as sociology, psychology and economics and less obvious fields such as biology, education, engineering, history, law, linguistics, mathematics, philosophy, and politics.

In strategic management, Kenworthy and Verbeke (2015) examined 5,317 articles in seven top-ranked journals published from 1980 to 2010. The researchers found 194 theories, 37 percent of which were indigenous to the discipline. They also found strategic management scholars borrow from a variety of disciplines including economics, psychology, sociology, biology, marketing and communication. In marketing, Kenworthy and Sparks (in press) examined 5,759 articles in five top-ranked journals from 1980 to 2010. They found a total of 979 separate theories, 791 of which were endogenous to marketing.

In consumer behavior, Brown and Dant (2009, p. 113) examined 173 articles published in the *Journal of Retailing* from 2004–2009 and found 119 different theories which they sub-grouped into the following twelve categories: “(1) marketing theories, (2) microeconomic theory, (3) consumer choice theory, (4) social exchange theory, (5) information processing theory, (6) satisfaction theory, (7) reference price theory, (8) competitive theory, (9) attribution theory, (10) other psychological theories for individuals, (11) other social psychological/sociological theories, and (12) other theories.” In supply chain management, Chicksand et al. (2012) examined 1,113 articles in three leading journals over a 16 year period. They found that nearly one-third of the empirical articles used theory and that slightly less than half of the theory was from outside the discipline.

In clinical psychology, Karr and Larson (2005) analyzed a representative sample of articles appearing in the most prominent, quantitative journals from 1990 to 1999. The authors discovered that 43 percent of studies were theory-driven. Of the forty-five theories found, 77 percent were used only once. In communication, Bryant and Miron (2004) systematically analyzed the treatment of theory via a probability sample of articles ( $n= 1,806$ ) in three stalwart journals from 1956 to 2000. The authors found that approximately 32 percent of the articles contained some theory.

In gerontology, Roberto, Blieszner, and Allen (2006) reviewed 838 empirical articles from thirteen top journals from 1990 to 1999. Explicit use of theory was found in nearly 42 percent of the articles. In family science, Taylor and Bagdi (2005) reviewed 673 empirical articles from 1990-

1999 in the *Journal of Marriage and the Family*. Explicit reference to theory was made in approximately 60% of the articles.

The aforementioned research has revealed a growing use of theory in empirical research and a reliance on borrowed theory across several disciplines. The awareness of high levels of theory importation raises critical questions regarding the value of imported theory (Suddaby et al. 2011) – an issue that we attempt to address in this piece.

### **3. Research method**

We made two initial decisions regarding the scope of this analysis. The first decision involved a sufficiently long time period that would: 1) allow for the emergence of trends and 2) mitigate the influence of editorial policy on the findings. The selected time frame begins in 1980 and ends at the publication embargo dates, which varied from mid-2011 to mid-2016.

The second decision involved selecting the operations management journals for this analysis. We elected to focus on highly-ranked OM journals based on the assumption that such outlets publish pieces with strong empirical research methods and important findings. Further, we restricted the sample to those reputable journals that have a history of publishing at least some empirical research, as many OM journals focus exclusively on modeling-based research. We chose a more-than-representative sample of such journals, as ranked in Barman et al. (1991), Barman et al. (2001), Petersen et al. (2011) and Fry and Donohue (2013) and examined in Shang et al. (2014). The Fry and Donohue (2013) research is particularly instructive here as its findings are based on

a data envelopment analysis of 15 journal ranking studies that do not rely on impact factors, a metric which may not effectively measure journal quality (Stonebraker et al. 2012).

The following eight scientific journals were included for review: Management Science (MS); Operations Research (OR)<sup>1</sup>; Journal of Operations Management (JOM); Decision Sciences (DS); Production and Operations Management (POM); International Journal of Production Research (IJPR); International Journal of Operations & Production Management (IJOPM); and, Manufacturing & Service Operations Management (MSOM). We note that Production and Operations Management and Manufacturing & Service Operations Management do not cover the entire time frame because the journals began publication in 1992 and 1999, respectively.

MS, OR, JOM, POM, and MSOM appear on the prestigious Financial Times (FT 50) list of reputable business related journals. DS is the flagship journal of an important academic society for operations management researchers, the Decision Sciences Institute (DSI). DS typically does well on OM journal rankings (Barman et al. 1991; Barman et al. 2001; Petersen et al. 2011; Fry and Donohue 2013) and it has a record of publishing empirical research. IJOPM is ranked a '4' in the Academic Journal Guide (AJG) published by Chartered Association of Business Schools in the UK (only MS, OR and JOM among the eight here have a higher ranking on the 1 to 4\* based system). IJPR typically ranks well on OM journal rankings (Barman et al., 1991, 2001; Petersen et al. 2011; Fry and Donohue 2013). It was the top ranked OM journal in an analysis by Goh et al. (1997). In addition to being reputable journals, IJOPM and IJPR provide a degree of diversity, as both are published from the UK – as opposed to the rest which are published in the USA.

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<sup>1</sup> OR contained a total of 2,302 articles, 85 of which were empirical, from 1980-2011. However, the journal did not contain any explicit theory testing articles. Hence, it was not included in the analysis.



### *Analytic technique*

The classification of published articles containing explicit uses of theory involved the following three key criteria. The process is illustrated in Figure 1 below.

1. An article must be empirical in nature. It must present a research method involving observation and/or experimentation, rather than simulation or pure conceptualization. Here, we rely on Rudner's (1966, p. 10) definition of theory which suggests that related scientific tests must be empirical in nature: "A theory is a systematically related set of statements, including some lawlike generalizations, that is empirically testable."
2. Each article must indicate at least one predictive hypothesis in advance of a research method(s) discussion. Research hypotheses usually were set apart and clearly labeled as, for example, *H1* or *Hyp 1*. In some cases, the research hypotheses were structured within paragraphs. In such cases, a hypothesis was recorded only if the related text clarified the predictive nature of the statement in question. Studies that involved only research questions and/or failed to make clear predictions were not included in the analysis.
3. The referenced theory was explicitly recognized as related to the hypotheses in the article (more than one theory could be used per article). The process of identifying theories was a relatively clear-cut, mechanical task which ignored qualitative concerns. Pre-existing theories were identified in the studies by name (e.g. Prospect theory) or citation (e.g. Kahneman & Tversky 1979). To justify a new theory for inclusion in our dataset, we relied on the presence of references, data, variables, diagrams, and hypotheses (Hunt, 2010; Wacker, 1998; Weick, 1995; Campbell, 1990)<sup>2</sup>. Importantly, we did not attempt to evaluate: 1) the link between explicit theories and hypotheses; 2) the extent to which *new* theories were nothing more than

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<sup>2</sup> The degree to which each of the components was sufficient is a complex issue, in part because such thresholds have not been established, i.e. a widely-held theory of scientific theory does not exist.

pre-existing theories; and 3) to what extent hypotheses were supported. In all cases, we assumed that the original article review processes effectively addressed such concerns.

Finally, each explicitly indicated theory was categorized by its origin. In line with Oswick et al. (2011), our assessment, "...of whether or not a given theory is borrowed is determined by whether or not the main proponent(s) is (are) either located within the [operations management] academic community or outside of it." It is noted that such classifications are somewhat arbitrary because all contemporary applied social science theorizing could be classified by its social science foundations, depending on one's perspective.

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#### **4. Findings**

The total number of peer-reviewed articles for the seven operations management journals was 17,909. The total number of empirical articles was 4,469, as seen in Table 1 below.

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The theory-driven density for the journals is derived by dividing the number of theory-driven articles by the total number of empirical articles. The theory-driven density for the empirical

articles was approximately 21 percent, as shown at the bottom of the ‘Total’ column of the table above. Approximately, one in five articles used at least one theory-driven hypothesis.

The growth in explicit theory usage for the journals is shown in Figure 2 below<sup>3</sup>. Theory-driven studies are presented as percentages of total empirical articles over time. Over three decades, theory-driven empirical research in the discipline has grown from being largely absent to being present in approximately 40 percent of empirical articles published in the major journals.

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It is evident that researchers are more frequently associating their hypotheses with theories. The journals that exhibit an increase in theory referencing for empirical research are JOM, DS, IJPR and IJOPM. The remaining journals, MS, POM and MSOM do not seem to show any consistent trend.

The process revealed a total of 874 separate theories explicitly used in the seven journals, the majority of which (834) were used only once. Here, one should take into account that there may be overlap with some variables and relationships across the theories revealed by the analysis. Further, some theories may represent lower or higher level meta-theoretical structures relative to other theories. Finally, it is possible that identical, or at the very least, extremely similar concepts and variables could be named differently by researchers. Of course, concerns regarding the

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<sup>3</sup> The years 2011 to 2016 do not include all journals and issues due to publication embargo dates, as mentioned in the Research Method section.

number of unique theories used and developed within OM should be mitigated by the rigorous peer and editorial review processes undertaken by major journals. Ultimately, even a conservative view would suggest that OM is responding positively to calls for more theoretical development and empirical usage.

With respect to theories used multiple times, Table 2 lists the 40 theories that were used more than once – in order of frequency of usage – for empirical research. Many of the theory names are familiar. Those that are not may be names that we generated – based on the content of a study – because authors did not provide a specific name for a new theory. Of the 40 theories, seventeen theories were used twice. Twelve theories were used three times. Two theories were used four times. Four theories were used five times. Two theories were used seven and eight times, respectively. One theory was used ten times.

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The theories were organized into categories in order to develop a sense of active and popular research programs in OM. The analysis, in this case, excluded articles from Management Science and Decision Sciences that focus specifically on information systems research. One hundred and fifty categories represented the resulting 466 theories. Figure 3 displays a truncated version of the results. A Pareto effect is observed with three research programs – functional interface, SCM integration and quality management – appearing to dominate all others. The finding suggests that

theory-driven empirical research focuses on: 1) integrating different aspects of the supply chain such as marketing and manufacturing; 2) relationships between the different functions in the organization as they relate to the supply chain such as organization processes and operations; and/or, 3) managing quality.

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In the following section, the most used theories are examined. The analysis leads to the development of a screening model for foreign theory.

### *The most used theories: review and relevance*

The 40 most used theories are shown in Table 2 above. The OM discipline accounted for nineteen theories: TQM factors and business performance model; theory of performance frontiers; QM practices and performance model; service guarantee framework; trade-off theory; e-procurement performance model; Malcolm Baldrige national quality award causal model; quality management theory based on Deming method; project performance model; quality practices, quality performance and business performance model; CM conformance and quality performance model; TQM practices model; organizational culture, time-based manufacturing and performance model; manufacturing flexibility model; supply chain agility framework; product variety model; business environment, operations strategy, and performance model; and, European Foundation for Quality Management (EFQM) model.

The field of economics accounted for eight theories: transaction cost economics; prospect theory; agency theory; regret theory; signaling theory; cumulative prospect theory; real options theory; and, human capital theory. The discipline of information systems accounted for six theories: information processing model; extended technology acceptance model; technology acceptance model; firm performance model; influence of task interruption on individual decision making model; and cognitive fit theory.

The strategic management discipline accounted for three theories: resource based view; contingency theory; and, knowledge-based view of the firm. The field of sociology accounted for two theories: institutional theory and social capital theory. The discipline of management accounted for two theories: expectancy theory and media richness theory.

Amongst the 40 most used theories, OM theories rank at the top for total number of theories (19) and theory usage (47 of 138 instances). However, if one narrows the subset of theories to only, for example, the top ten theories, the results are substantially different. Only one OM theory appears with five uses. The field of economics dominates with three theories and twenty-two uses. Strategic management theories appear twice with sixteen uses. The domestic-to-foreign theory usage ratio in the top ten is five to sixty-four (1 to 12.8).

The domestic-to-foreign ratio finding serves as a basis for exploring the origins of the 874 theories used in the OM journals. The origins are displayed in Table 3 below. The usage of OM theories represents 68% of total explicit theory testing. The fields of information systems, marketing, general management, strategic management and economics are represented by approximately 14%, 5%, 4%, 3% and 2% of theory usage, respectively.

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## 5. Discussion

To put our findings in perspective, we begin by comparing and contrasting them with findings from the adjacent disciplines of strategic management (Kenworthy and Verbeke 2015) and marketing (Kenworthy and Sparks in press). The findings are displayed in Table 4 below.

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The first finding involves the relative extent of empirical research. It is obvious the OM's sister disciplines, SM and MKTG, focus a great deal more attention on empirical research in top-ranked outlets. OM's status here may not be a problem, though, as much progress has been made via optimization, simulation and modelling. On the other hand, some scholars (c.f. Soltani et al. 2014; Westbrook 1994) suggest that the dominant focus on prescriptive solutions has been pursued at the expense of broader contributions to theory.

The second finding involves the amount of, and change over time in, theory driven research. Theory-driven research in SM averaged 19.4% of all empirical work. It grew from almost nothing

in 1980 to nearly 25% of all empirical work by 2010 (Kenworthy and Verbeke 2015). In MKTG, theory-driven research averaged 24% of all empirical work. It grew from about 13% in 1980 to a height of approximately 40% in the early 1990s and declined to approximately 24% by 2010 (Kenworthy and Sparks in press). In OM, theory-driven research averaged 21.3% of all empirical work. It grew from almost no theory-driven research in 1980 to approximately 21% of all empirical work by outlet embargo dates. It is impressive that OM is heeding the calls for more theory-driven research and further still, to discover that the discipline is holding its own vis-à-vis sister disciplines.

With respect to the number of theories uncovered, Kenworthy and Verbeke (2015) found 194 theories in SM. In MKTG, 979 theories were uncovered. In OM, we found 555 theories. The differences may be partly explained by the extent to which theories are tested. Table 5 below presents the top 10 tested theories in the three disciplines. In SM, researchers appear to be much more focused on assessing the verisimilitude (Popper, 1963) or empirical status of theories, whereas MKTG and OM scholars may be a bit less inclined.

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With respect to the origin of theories, SM researchers used domestic theory in 37% of theory-driven empirical research. MKTG and OM researchers used domestic theory in approximately 80% and 68%, respectively, of theory-driven research. While MKTG and OM appear to be more



geared toward developing domestic theory than SM, the vast majority of their theories are tested only once and further, few tests of domestic theories appear multiple times in the major outlets.

Overall, it appears that OM is extremely competitive with respect to domestic theory development and theory-driven research. There is little doubt that OM scholars are overcoming the hurdles associated with creating, communicating and testing their own theories. They are anticipating and working towards achieving the standards of applied social science research set by, among others, Agarwal and Hoetker (2007, p. 1319):

Management research can create value when theory development has been uniquely motivated by the challenges faced by firms and managers. So motivated, management research can provide theoretical insights not available from the related disciplines alone. We argue that, to advance management research, it is not merely enough to conduct psychology-, sociology-, or economics-based research in a business setting. Doing so creates little value beyond that available in the particular related discipline. Rather, it is necessary to connect disciplinary insights with those generated by the increasingly rich management discipline.

An area of concern that is particularly salient for OM and MKTG is the observed domestic to foreign theory ratio amongst the most used theories (Table 5). It appears that both disciplines rely heavily on foreign theory for scientific progress and understanding. According to Merton (1973), foreign theory can be of great value to scholars of nascent disciplines who wish to develop academic legitimacy. The use of established foreign theory can allow a young discipline to project a scientific image beyond its boundaries (Hambrick, 2007), perhaps providing for, among other things, positive promotion and tenure decisions for bold and curious scholars.

The ongoing use of foreign theory may, however, represent a sub-optimal solution for OM. Often, the use of foreign theory is defended on the grounds that, for example, OM is multi- or interdisciplinary. There is certainly some face validity to the claim that OM cannot stand alone. However, this does not imply indiscriminate borrowing for several important reasons. First, such behavior can lead to significant identity problems due to overly porous boundaries, the result of which can be confusion about the nature of the OM discipline on the part of both colleagues in related disciplines and business practitioners (Suchan and Charles, 2006). Second, according to Huddaby (in Birkinshaw et al. 2014, p. 43, brackets added):

...if we are overly dependent upon theories drawn from outside disciplines, we run the danger of becoming isolated from the phenomenal world of [operations management]. When that happens, the risks of being hijacked are perhaps overshadowed by the bigger risk of becoming irrelevant.

Foreign theories are always packaged with agendas, metaphors, and methodological predispositions, some of which may be highly incompatible with our unique position and understanding of OM phenomena (Markóczy and Deeds 2009; Huddaby in Birkinshaw et al. 2014). Third, the path to disciplinary maturity may be frustrated by a focus on foreign theory (Narasimhan 2014). Finally, publication space in major outlets is limited and arguably, should be reserved for only the most compelling and productive research for the OM discipline.

Ultimately, it appears that theory importation should be carefully considered. To this end, the next section offers some general guidelines for importation in order to ensure that OM remains connected to sister disciplines while maintaining the integrity of its scientific research pursuits.

### *Towards a model for screening foreign theory*

The OM discipline has clearly made great strides in terms of both domestic theory development and theory-driven research. As previously mentioned, there are two findings with respect to theory-driven research. The first finding is that OM scholars are producing an incredible amount of domestic theories. The second finding is that OM scholars appear to favor testing foreign theory over domestic theory. It is not clear why the empirical status of foreign theories appears to take precedence over that of its domestic counterparts in the major outlets. It may be that there is a widely-held, implicit belief that foreign theory is simply better than domestic theory. It may be that OM scholars believe that empirical research is easier to publish when associated with foreign theories. It may also be that OM researchers are not fully aware of the incredible amount and diversity of domestic theory – specifically focused on domestic phenomena and problems – now available to them.

There is little doubt that OM, like SM and MKTG, will continue to import theory. There is also little doubt that some of the foreign theory is of great service to OM. As MacCarthy et al. (2013) indicate: “Theories and concepts can and routinely are transported across disciplines... This type of cross-fertilization is always valuable and enriching when done well.” The question to ask is: are we doing a disservice to our discipline by importing certain theories? Our domestic theory is valuable, as is the space in our major outlets. In order to promote only the importation of useful theory, we recommend the consideration of a model for the rationalization of theory importation. The model, displayed in Table 6 below, indicates two conditions that assist with a decision to use

foreign theory. The model is informed by the fears and concerns vis-à-vis theory importation from a number of scholars across the social sciences (Ilgen and Klein 1989; Murray and Evers 1989; Johnson-Lutjens and Tiffany 1994; Amundson 1998; Aigen 2005; Truex et al. 2006; Floyd 2009; Malmi and Granlund 2009; Whetten 2009; Oswick et al. 2011; Kenworthy and McMullan 2013; Kenworthy and Verbeke 2015; Kenworthy and Sparks in press). That so many scholars from a wide array of social science disciplines voice concerns suggests that the value in developing a robust screening model exists within, and well beyond, the boundaries of OM.

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The first, necessary condition of the screening model is that a foreign theory must be relevant to the operations management discipline. There are numerous conceptualizations of the nature of operations management. We offer three here. Schmenner & Swink (1998, p. 99) argue that OM is, "...a mongrel mixture of natural and behavioral science". Lovejoy (1998, p. 106) suggests that, "OM is the selection and management of transformation processes that create value for society". The Massachusetts Institute of Technology webpage for OM<sup>4</sup> indicates that, "Operations Management deals with the design and management of products, processes, services and supply chains. It considers the acquisition, development, and utilization of resources that firms need to deliver the goods and services their clients want."

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<sup>4</sup> Sourced at <http://mitsloan.mit.edu/omg/om-definition.php> on June 11, 2016.

For a foreign theory to be considered, it should offer insight into critical operations management outcomes such as products, processes, services and supply chain performance that are relevant to a variety of stakeholders of applied social science knowledge including practitioners, educators and policy makers. Generally speaking, foreign theories that do not offer insights into such central issues may be better left for testing in their home disciplines. For example, a (firm-level) strategic management theory that includes a variety of management factors including some from OM might be best left in SM because the theory extends beyond the reach of OM. An exception to this condition might be one in which a foreign theory provides more insight into a substantial amount of existing empirical OM evidence than do extant OM theories. Here, the foreign theory would provide an argument for continuing (in a different direction), or halting, related empirical research.

The second, sufficiency condition of the screening model is that a foreign theory must be powerful for the OM discipline. A foreign theory must offer strong prediction and explanation. Hunt (1991, p. 149) argues that, “The purpose of theory is to increase scientific understanding through a systematized structure capable of both explaining and predicting phenomena.” The foreign theory might even provide insight into controllable variables for practitioners, as well as the best return on investment for specific controllable variables. In order to maintain a foreign theory’s predictive and explanatory power, it must be imported with minimal ad hoc adjustment. The substantial adjustment to, or elimination of, various methodological aspects of a theory, e.g. variables and/or relationships amongst variables, risks the nullification of the theory.

An additional aspect of the second condition is that a foreign theory does not suffer from poor outcomes of rigorous testing in its own discipline. The argument for importation is arguably

weakened if, for example, substantial testing of a marketing theory that is designed for marketing knowledge creation results in a dramatic loss of confidence on behalf of its proponents.

For purposes of illustration, we apply our screening model to resource based view (RBV), the focus of a 2016 Journal of Operations Management forum. The RBV is a popular perspective from the strategic management discipline that represents contributions by various scholars including Penrose (1959), Lippman and Rumelt (1982), Wernerfeldt (1984), and Barney (1986, 1991). The core RBV conjecture is: firm-level resources generate firm-level, sustained competitive advantages. Resources must be valuable, rare, imperfectly imitable and lacking in substitutes. Barney (1991) indicates that RBV rests on two assumptions: 1) that there are systematic differences across firms within an industry regarding the resources that they control and 2) resources remain relatively stable across firms over time.

The first condition of the screening model is that a foreign theory be relevant to OM. As previously indicated, RBV's criterion variable is firm-level, sustained competitive advantage, a notion that involves a combination of firm characteristics (an overall effect) rather than an influence from one aspect of a firm, such as operations. Given that OM scholarship tends to operate within the confines of the discipline rather than at the level of the firm overall, there may be a disjoint between RBV and a substantial portion of the OM research agenda.

The second aspect of the first condition is that a foreign theory must be able to explain existing evidence in the discipline. Here, the criterion variable of RBV is a questionable fit for OM. Bromiley and Rau (2016, p. 96) argue that, "...operations activities per se do not tie to sustained

competitive advantage. Operations management activities have performance implications, but good operations management is neither necessary nor sufficient for sustained competitive advantage.” The explanatory variable of RBV, resources, may offer more possibility than the dependent variable. However, RBV does not indicate which specific resources, OM ones or otherwise, create sustained competitive advantage.

The second condition of the screening model is that a foreign theory must be powerful. The first aspect of this condition is strong prediction. The predictive power of RBV has been called into question by a number of scholars (c.f. Foss 1998; Priem and Butler 2001; and Bromiley and Rau 2016). Priem and Butler (2001, p. 28) even suggest, indirectly, that RBV may not be amenable to empirical tests:

The underlying problem in the statement "that valuable and rare organizational resources can be a source of competitive advantage" (Barney, 1991: 107) is that competitive advantage is defined in terms of value and rarity, and the resource characteristics argued to lead to competitive advantage are value and rarity. Instead, the characteristics and outcomes must be conceptualized independently to produce a synthetic statement.

Bromiley and Rau (2016, p. 96) also indicate concern regarding tautology while questioning the extent to which RBV offers interesting predictions:

One might argue the RBV predicts that firms will differ and that those differences will improve performance. However, any sensible theory of organizations predicts firms differ and those differences will influence performance, but obviously firm differences can have negative or positive influences on performance. One might argue the RBV predicts serial correlation in performance, but again any sensible theory of organizations predicts this. Even a conventional economic model where

firms make optimal decisions can make these predictions if we assume random shocks at the firm level and adjustment costs.

The second aspect of the powerful condition is that a foreign theory must not require substantial ad hoc changes in order for it to be used. In the case of RBV, it may be that OM researchers have to change the criterion variable to one more suitable. Further, OM researchers may wish to replace the rather generic term 'resources' with specific OM variables. Such changes may morph RBV in ways that: 1) force a change in underlying assumptions or 2) question its use altogether.

The third aspect of the powerful condition is that a foreign theory should present a strong empirical status in its home discipline, as a result of rigorous tests to falsify it. The RBV receives a mixed review on this account. Newbert (2007, p. 121) systematically assesses empirical RBV research and finds that the theory, "...has received only modest support overall and that this support varies considerably with the independent variable and theoretical approach employed." Crook et al. (2008, p. 1150) meta-analyzed 125 studies and found that "...22 percent of the utility available from predicting performance differences across organizations is provided by strategic resources." It should be noted that the criterion variable in this case was not sustained competitive advantage, the one prescribed by RBV.

Ultimately, the analysis of RBV as a candidate theory leads to more questions than answers. It does not appear that OM is particularly well-served by employing RBV for scientific knowledge creation.



## 6. Conclusion

Numerous conceptual and empirical pieces that characterize the historical roots and evolution of the OM discipline have been published. An area that remains largely unexplored is the nature and extent of theory use in empirical OM research. “Theories,” according to Schmenner et al. (2009, p. 339), “explain facts and provide stories as to how phenomena work the way that they do. They can, and should, be used to make predictions.” Handfield (in Meredith 2002) argues that a turn toward theory-driven research is critical for disciplinary progress. Here, we examine the use of theory in seven journals over more than three decades. Our findings offer insight into scientific progress and disciplinary maturity.

Generally speaking, our results point toward success and scientific progress. OM has responded strongly to calls for more theory by producing 596 home-grown theories. Theory-driven empirical research has grown strongly from almost no trace in 1980 to approximately 21% of all empirical work. Further, OM scholars have created most of the theories that have been tested.

The research findings here also revealed some areas that may be targeted for improvement. First, most of the domestic theories were used only once for empirical research. Second, only a select few domestic theories are tested multiple times in our dataset. We must subject each new theory to substantial testing in order to determine its empirical status and hence, value to the discipline. Otherwise, as Schmenner et al. (2009, p. 340) suggest, “Theories come, but they never go.” Third, the list of most used theories is dominated by foreign theories. There are several reasons that may

explain this behavior. It is possible that researchers find more value in using foreign theory. It is also possible that journal reviewers and editors look more favorably on popular foreign theories than their domestic counterparts.

In isolation, the findings may be somewhat hard to appreciate. Hence, we compare and contrast them with related research findings in the sister disciplines of strategic management and marketing. We conclude that OM appears to be very competitive with both disciplines.

The finding that OM appears to rely on foreign theory led us toward the development of a two-condition screening model. The model requires that foreign theories be vetted for relevance and powerfulness. As with all models, judgement should be exercised on the part of researchers and journal editors and reviewers when deciding to accept or reject a foreign theory. We demonstrate use of the model by vetting resource based view. The implication of the screening process is that RBV may not add much value to OM research and hence, all OM stakeholders should be tread carefully when considering it for scientific work.

We should note that the research undertaken here is not without its limitations. We recognize that that OM is a large discipline with as many as 132 journals (Fry and Donohue 2013). Our examination of content published in seven of them may be viewed as insufficient. We defend our decision to review highly ranked journals based on the following rationale. First, there are similar published works that use the same method (Kenworthy and Verbeke 2015; Kenworthy and Sparks in press). Second, the Fry and Donohue (2013) research, which offers a ranking of journals by quality without depending on problematic impact factors (Stonebraker et al. 2012), supports the

journals in our dataset. Third, the journals that we selected are well respected by most of our colleagues.

Finally, some scholars may take issue with our method for identifying theory. During our data collection, we relied on our knowledge of the discipline; the citations provided by authors of original work; and, the careful scrutiny of journal reviewers prior to publication. Ultimately, we are confident that a different set of researchers would produce similar findings – that OM has made great strides with respect to theory-driven research with much work remaining.

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**TABLE 1**  
**Empirical Article Counts by Journal**

	<b>MS</b>	<b>JOM</b>	<b>DS</b>	<b>POM</b>	<b>IJPR</b>	<b>IJOPM</b>	<b>MSOM</b>	<b>Total</b>
Articles	3811	1092	1436	1132	8218	1900	320	17909
Empirical Articles	1008	665	570	250	903	1034	39	4469
Theory Driven Articles	115	264	199	64	156	146	8	952
Theory Driven Density	11.4%	39.7%	34.9%	25.6%	17.3%	14.1%	20.5%	21.3%

**TABLE 2**  
**Theories Explicitly Tested More Than Once<sup>5</sup>**

Theory	Use	Theory	Use
Transaction cost economics	10	Expectancy theory	3
Resource based view	8	Malcolm Baldrige National Quality Award Causal Model	3
Contingency theory	8	Real options theory	3
Information processing model	7	Quality management theory based on Deming method	2
Prospect theory	7	Project Performance model	2
Institutional theory	5	Human capital theory	2
extended Technology acceptance model	5	Media richness theory	2
TQM factors and business performance model	5	Quality practices, quality performance and business performance model	2
Agency theory	5	CM conformance and quality performance model	2
Technology Acceptance Model	4	TQM practices model	2
Social capital theory	4	Top management support and internal quality results model	2
Theory of performance frontiers	3	Organizational culture, time-based manufacturing and performance mode	2
QM practices and performance model	3	Manufacturing flexibility model	2
Service Guarantee Framework	3	Firm performance model	2
Knowledge-based view of the firm	3	Influence of task interruption on individual decision making model	2
Regret theory	3	Supply chain agility framework	2
Trade off theory	3	Cognitive fit theory	2
Signaling theory	3	Product variety model	2
Cumulative prospect theory	3	Business environment, operations strategy, and performance model	2
e-procurement performance model	3	EFQM model	2

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<sup>5</sup> Original theory names used where identifiable. In cases where no theory name was provided in the article, the authors provide one based on study content.

**TABLE 3**  
**Fields of Explicitly Tested Theories and Frameworks**

Field	Total Theories	% of Total
Operations	596	68%
Information systems	122	14%
Marketing	44	5%
General management	31	4%
Strategic management	25	3%
Economics	17	2%
Psychology	12	1%
Sociology	8	1%
Accounting	5	1%
Innovation	5	1%
Engineering	3	0%
Entrepreneurship	2	0%
Communication	1	0%
Health sciences	1	0%
International business	1	0%
Philosophy	1	0%



**TABLE 4**  
**Comparison / Contrast Data with Strategic Management and Marketing**

	<b>OM</b>	<b>SM</b>	<b>MKTG</b>
Total Articles	17909	5317	5759
Total Empirical Articles (%)	25.0%	49.1%	77.0%
Theory Driven Density	21.3%	19.4%	24.0%

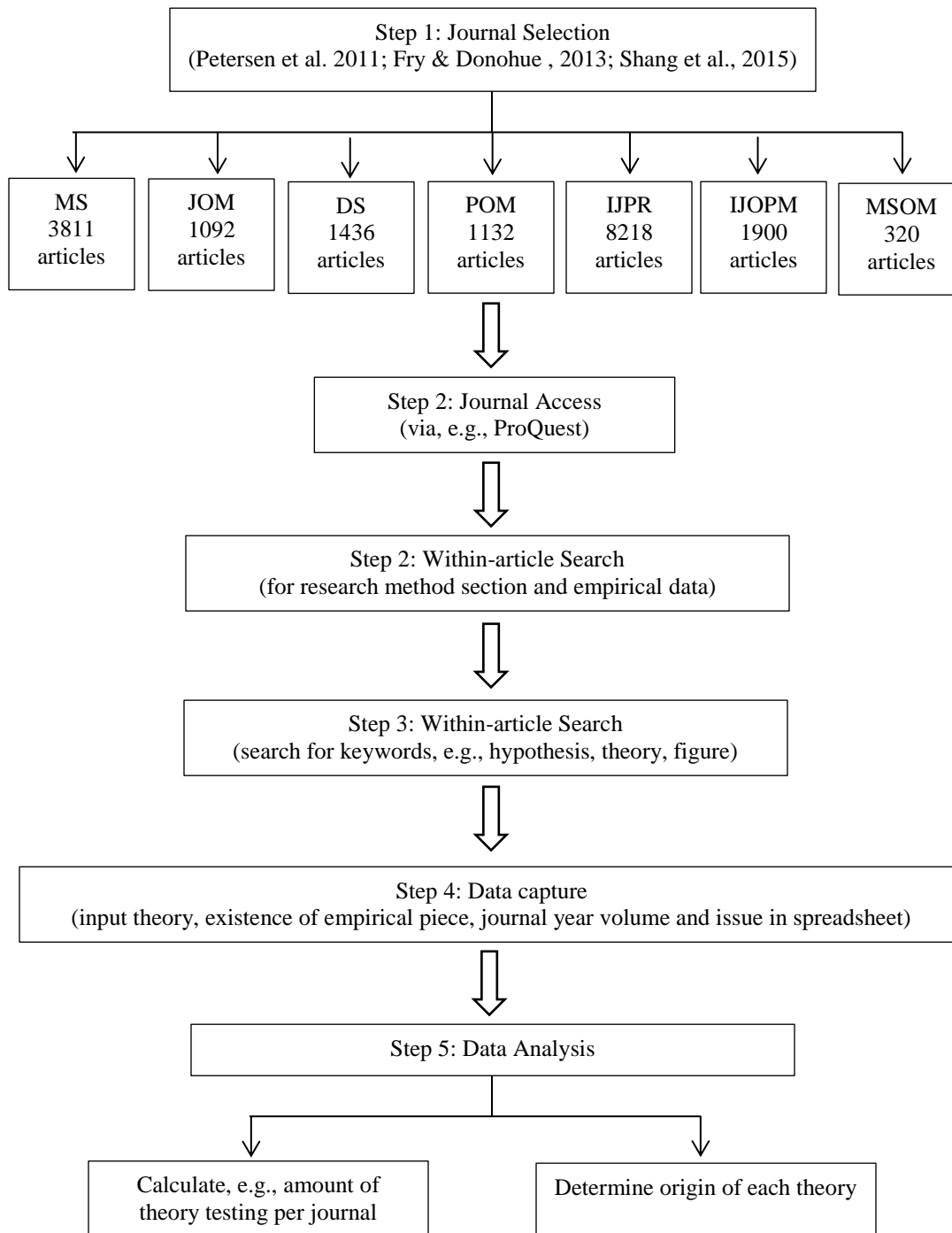
**TABLE 5**  
**The Top Ten Theories tested in OM, SM and MKTG**

OM		SM		MKTG	
Theory	Use	Theory	Use	Theory	Use
Transaction cost economics	10	Resource based view	82	Regulatory focus theory	15
Resource based view	8	Transaction cost economics	76	Transaction cost Economics	12
Contingency theory	8	Agency theory	76	Theory of Reasoned Action	8
Information processing model	7	Institutional theory	22	Signaling theory	7
Prospect theory	7	Resource dependence theory	17	Construal level theory	7
Institutional theory	5	Upper echelon theory	17	Elaboration Likelihood theory	7
extended Technology acceptance model	5	Contingency theory	16	Resource based View	6
TQM factors and business performance model	5	Social capital theory	14	Accessibility-diagnostics framework	6
Agency theory	5	Signaling theory	13	Attribution theory	5
Technology Acceptance Model	4	Stakeholder theory	11	Social exchange theory	4
				Self-perception theory	4
				Two-factor theory	4
				Agency Theory	4

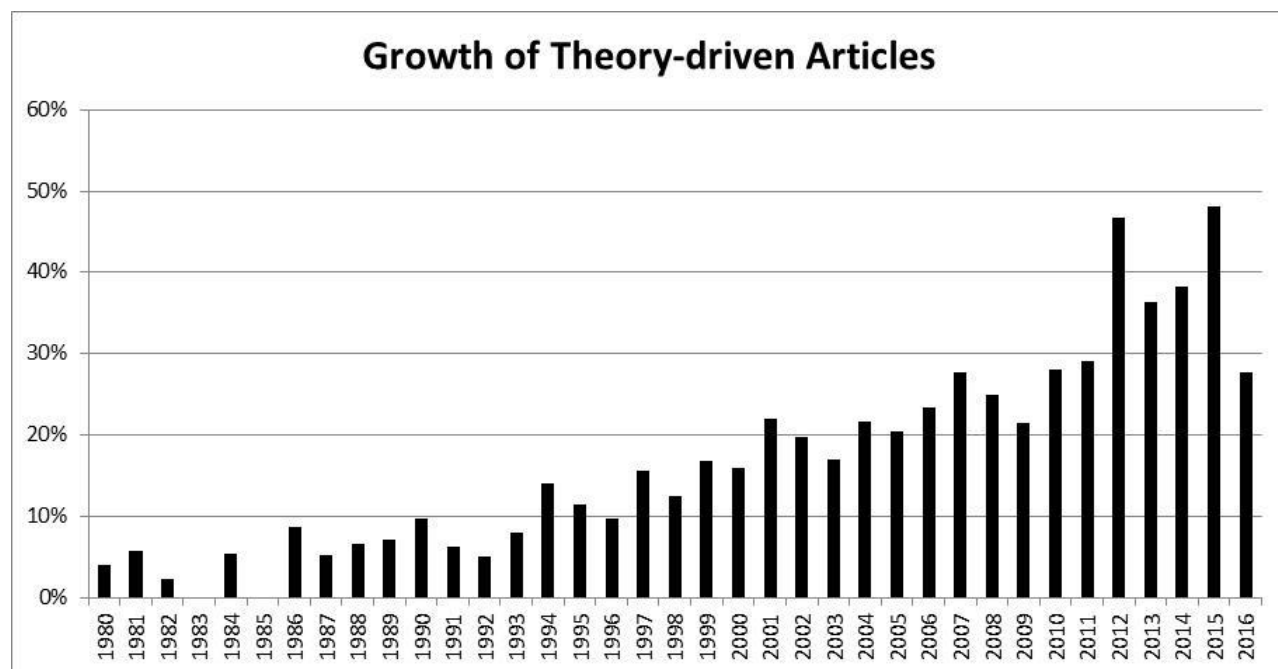
**TABLE 6**  
**Model for the Assessment of Foreign Theory**

<b>Condition</b>	<b>Definition</b>
Relevant	<ul style="list-style-type: none"><li>• Explicates core issues in the discipline</li><li>• Explain existing evidence in the discipline</li></ul>
Powerful	<ul style="list-style-type: none"><li>• Strongly predictive</li><li>• Does not require substantial ad hoc changes</li><li>• Limited concerns about prior testing in home discipline</li></ul>

**FIGURE 1**  
**Data collection and Analysis Process**



**FIGURE 2**  
**Growth of Theory-driven Research**



**FIGURE 3**  
**Categorization of Empirical OM Research**

