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INVITED COMMENT-ESSAY

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Testing the shoulders of giants—Replication research using registered reports

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Abstract

This editorial encourages supply chain management researchers to conduct and submit replication research for publication consideration to the *Journal of Supply Chain Management*. The Journal is particularly interested in efforts to replicate both recently published papers that have the potential to change the direction of the discipline and highly influential or "seminal" papers in the supply chain management discipline, regardless of where they were initially published. The Journal will be using the registered report process for these submissions to create strong incentives for researchers to conduct replication studies.

KEYWORDS
distribution and logistics, ethics, packaging, transportation

INTRODUCTION

Replication research is a fundamental component to the scientific process. It improves our understanding of theory by establishing where extant empirical results do and do not hold (Pagell, 2021). Hence, replication studies provide predictive validity and help determine the generalizability of our theories (Schoenherr & Swink, 2012). In addition, doing replication research should be an attractive way for early career researchers to learn to conduct empirical research, since they start with an established research question and have a previously published design to build upon. Replication should then be common. Yet, compared with our colleagues in many other disciplines, supply chain management (SCM) scholars so far have not frequently conducted (or at least published) replication research (Brandon-Jones, 2017). This is why a recently published *Journal of Operations Management* forum article called for SCM researchers to systematically address this issue (Pagell, 2021).

The purpose of this editorial is to encourage SCM researchers to conduct and submit replication research for publication consideration to the *Journal of Supply Chain Management*. We are particularly interested in efforts to replicate both recently published papers that have the potential to change the direction of the discipline and highly influential or "seminal" papers in the supply chain management discipline, regardless of where they were initially published. We will be using registered reports to create strong incentives for researchers to conduct replication studies.

Replication research may reproduce all aspects of a prior study or it may vary certain conceptual, methodological, or substantive facets of the original (Brinberg & McGrath, 1985). It provides confirmatory or disconfirmatory evidence, and it may help identify refinements and establish new boundary conditions to existing theories. A pure replication duplicates all elements of the original. In contrast, a differentiated replication systematically varies certain elements of the original. Pagell (2021) points out that pure replication is not possible in most

empirical supply chain management research, other than research using publicly available data sets, because replicating the sample is not possible. Other issues such as changing standards of rigor may make pure replication undesirable or impractical.

While rare, replication studies have been conducted in the SCM discipline. For example, Kaynak and Hartley (2008) replicate prior research from Kaynak (2003) on quality management and extend the conceptualization of quality management to the supply chain by including perspectives from customers and suppliers. Kumar et al. (2015) replicate a taxonomy originally proposed by Murphy et al. (1996) to measure green logistics. The replication extends this prior work toward a broader and more general taxonomy of green supply chain management.

Replication research has clear benefits. However, the rarity of such studies suggests that many researchers perceive significant disincentives to conducting replications. This editorial combined with the registered reports process should address the common concerns raised about replication research and provide incentives to conduct replication studies. First, some reviewers and editors consider replication uninteresting and hence unlikely to get read or cited. In response, we would note that at the time of this editorial, Schoenherr and Swink's (2012) cross-validation and replication of Frohlich and Westbrook's (2001) arcs of integration concept has more than 555 (Google Scholar) citations. Second, many in the discipline do not consider research that confirms a theory, as opposed to disconfirming it or confirming and extending it, to be publishable in top journals (Frohlich & Robb Dixon, 2006). This editorial, recent research in the *Journal of Operations Management* (Pagell, 2021), and a recent webinar attended by the editors of this journal, the *Journal of Operations Management*, The *Journal of Business Logistics*, and the *International Journal of Operations and Productions Management* hopefully make it clear that this is not the case.

Third, some researchers, especially junior ones, fear retaliation could result from refuting a more senior colleague's work, although Frohlich and Dixon suggest that this concern might be over-blown. Further, to address this perception and seed a discourse on doing replications in SCM, we had conversations with leading researchers in the discipline (Academy of Management OSCM Division Distinguished Scholars and or European Operations Management Association Fellows). We asked them which of their own articles they would most like to see replicated and why, as well as which elements of the article they would directly replicate and which they would change or extend. Recordings of each dialog can be viewed at the Journal's website. Finally, our discipline—like most others—has a bias toward significant results (Pagell & Kristal, 2011). The registered report process addresses this issue.

REGISTERED REPORTS

As Table 1 indicates, doing replication research requires nearly as much work as other empirical research, and the payoffs are perceived to be only marginally attractive, especially when it comes to pure replication research. Registered reports are a way to change the payoff structure. Under the registered report process, researchers conceptualize a project and design the empirical protocol. The researchers submit their proposal for review prior to conducting the empirical work. The journal then accepts the proposed research in principle or rejects it. Next, the authors of the accepted in principle manuscript execute the empirical protocol that they described in their proposal and subsequently submit the full paper. The full paper is then reviewed a second time and accepted assuming that the protocol which was accepted in principle was carried out and defensible and valid conclusions are drawn from the results. Importantly, the final acceptance does not depend on the empirical results. Or as a one scholar has phrased it, "Because the study is accepted in advance, the incentives for authors change from producing the most beautiful story to the most accurate one." (Center for Open Science, 2021).

TABLE 1 Payoff table for well-conceived, well-executed empirical replication research

Replication study outcome	Likely payoff – conventional review process	Likely payoff with registered reports
Disconfirmation	Threat to received wisdom/Possible retaliation → Difficulty publishing	Update of received wisdom → Publication
Null results	Implicit disconfirmation of prior work with significant results → Difficulty publishing	Implicit update or expansion of state of knowledge due to new or different context → Publication
Confirmation	"Not interesting" → Difficulty publishing	Confirmation of received wisdom *despite* new or different context → Publication

JSCM has begun considering replication studies for publication. *JSCM* will publish both pure and differentiated replications. Replication studies that include an extension are equally welcome. Scholarship that meets these criteria may make for excellent first essays in multiple essay dissertations, for instance. We will use the registered report process, rather than the conventional review process.

SUBMISSION GUIDELINES AND DETAILED REVIEW PROCESS

Replication submissions will follow a two-stage review process (see Figure 1). In the first stage, the proposal will be reviewed based on two broad criteria. First, would replicating some or all of the original study make a significant contribution to the SCM literature? Therefore, the introduction and/or literature review must explain why it is worthwhile to replicate the original study and if appropriate to extend it in the manner proposed. *JSCM* is happy to provide authors informal feedback on this criterion prior to reviewing the entire proposal.

Second, is the proposed empirical design robust? We would expect the proposed research to be designed so that it was capable of either validating or calling into question the findings of the original article. The design will need to substantively follow the methodology of the original paper but do so using modern techniques and standards (for example, a multiple informant survey instead of a single informant survey) to increase confidence in the validity of the original findings if the authors

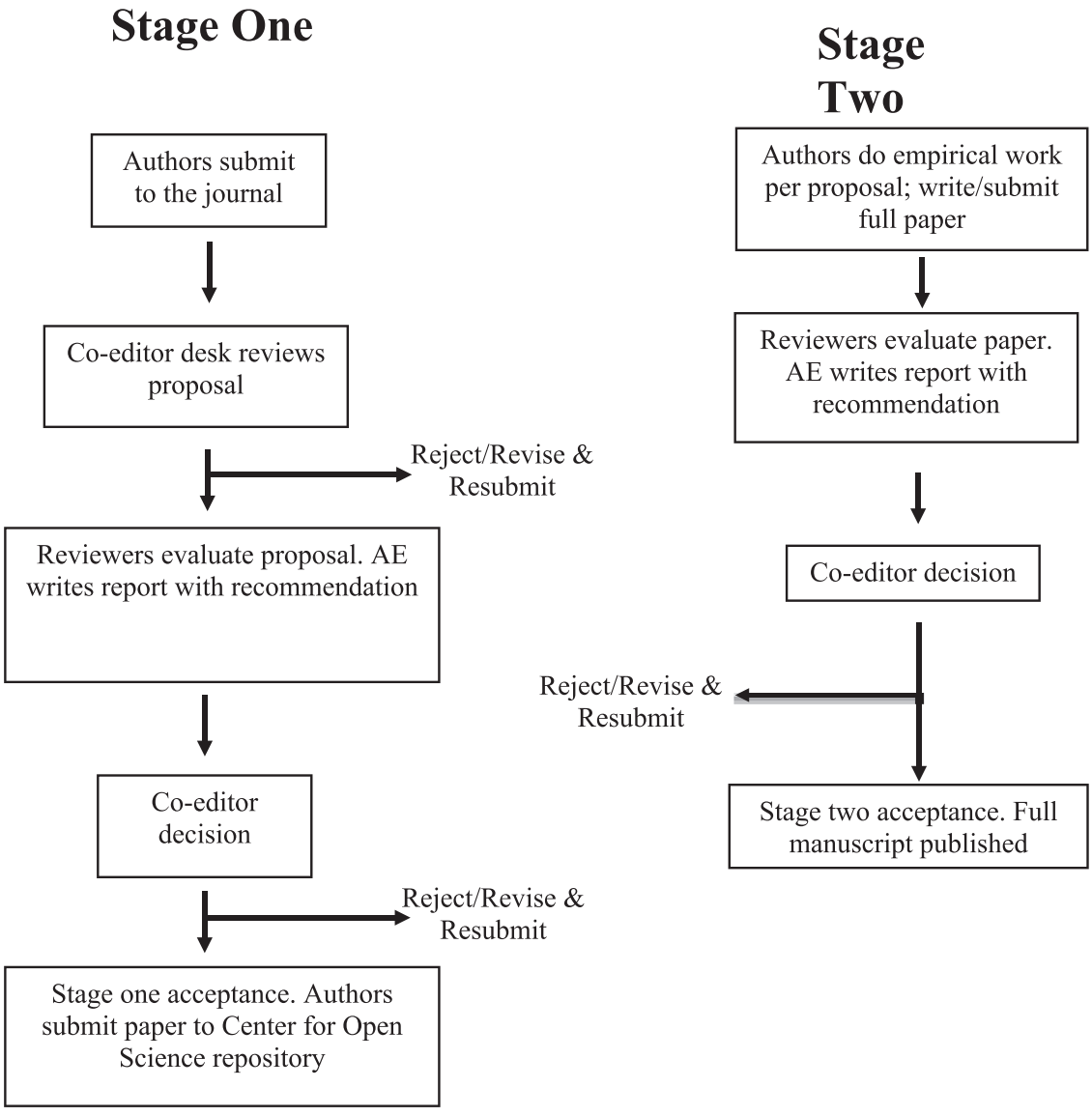

FIGURE 1 Review process map

do indeed confirm. But the design must also be capable of identifying the reason(s) for the departure if the results do not confirm the original study. These, among other factors, could be differences in:

- Operationalizations
- Population, including industry and geographical location
- Data collection protocol
- Analytical technique
- Independent and dependent variables
- Control variables

For example, Zhang and Xia (2013) replicated Hendricks and Singhal's (1997) study on the link between quality management and firm performance. In the replication, they used the methods of the original study as well as more advanced methods developed subsequently to show how the methods impacted the results.

In keeping with the principles of Open Science, authors must agree to share their data with the editors and reviewers during the review process. Authors are also encouraged to make their data permanently publicly available when the manuscript is published, when possible. Authors must fully disclose potential and perceived conflicts especially as they relate to the original submission. Authors are encouraged to "err on the side of extreme caution" when it comes to these disclosures.

The stage one review process will start, like all submissions to *JSCM*, with one of the co-editors reviewing the proposal to be sure that the proposal fits the criteria described in this editorial, and generates a belief that, in its current state, it has at least a minimal likelihood of being favorably evaluated by *JSCM*'s reviewers. Proposals that fail to satisfy any of these criteria will be desk rejected.

Proposals that are sent for review will be assigned to an Associate Editor as well as three reviewers. The stage one proposal submission will essentially contain the elements of the "front end" of a conventional submission: introduction, literature review, research model (hypotheses) and methodology. Proposals will be reviewed to ensure the proposed replication meets the two broad criteria above; that the replication will make a significant contribution and the design is robust.

The first stage of the review process will assess whether the proposal contains or accomplishes the following:

1. Specify the study that will be replicated and why it is important to replicate some or all of this study.
2. Stipulate and discuss the hypotheses.
3. Specify the type of replication being proposed: pure replication, differentiated replication, or replication and extension.
4. Discuss the possible findings, including the possibility of null results, and their interpretation including clarifying how any deviations from the original study will be interpreted.
5. Describe the dependent, independent, and control variables and specify how they will be measured.
6. Explain the sampling strategy and data collection instruments. Specify the target sample size and composition. Provide preliminary evidence of sufficient power based on the effect sizes in the initial study.
7. Describe the planned statistical analysis, being as specific as possible.
8. List the two to three most important risks to successfully executing the proposal (e.g., deviations from intended sample size and sample composition) and discuss how the design mitigates these risks.
9. Provide a timeline for when will the data be collected and the final manuscript will be submitted.

The above reflects that we are primarily expecting large-scale, quantitative replication studies. However, we are also supportive of efforts to replicate qualitative studies (Aguinis & Solarino, 2019).

Like all initial submissions, *JSCM* may accept, reject, or invite the authors to revise the stage one proposal. Upon acceptance, authors will deposit their registered report (proposal) with the Center for Open Science's repository. These registered reports will note *JSCM*'s acceptance in principle reducing the risk to researchers, especially early career researchers, from pursing this path since they will rightfully be able to claim their work has already been peer reviewed. Where appropriate preregistration with an embargo can be used.

The second stage of the review process will review the entire manuscript. Registered reports reassure scholars that their peers consider the research design as sufficiently rigorous and valid. Therefore, it follows that scholars may not deviate from their original plans, without proper justification, once the proposal has been accepted in principle (van der Aalst et al., 2019).

If the empirical study, as conducted, deviates from the proposal, this must be actively disclosed. For instance, if a survey has fewer responses than aimed for, the reason for this should be explained and the implications for the quality (power) of the statistical analyses should be carefully reviewed.

For proposals that are accepted in principle, the intent is to publish the final paper once the empirical design is executed and written up. Rejection at this stage should be exceedingly rare.

For the second stage review, the AE will determine if the paper should be sent back out for review by some or all of the initial reviewers or in very rare cases (e.g., the initial reviewers are not available) new reviewers. This second stage review will be much narrower than the typical review process and will focus on:

1. Was the empirical design executed as specified and within the specified timeline?
2. Does the empirical analysis support the authors' conclusions?
3. Is the manuscript written to maximize its potential impact?

The only reason to reject at this stage would be if the authors did not execute the empirical design as specified, without proper justification, or if they did not execute it within the timeline specified. However, points 2 and 3 may require significant revisions prior to final acceptance.

CONCLUSION

We encourage our fellow supply chain management researchers to propose a replication study. And we hope that this editorial, the registered report process and the related conversation going on in the wider SCM discipline will address the perceived disincentives to doing such research, because building a tradition of systematic replication will improve the validity of our SCM theories, facts and predictions.

In case of questions, please contact Tom Gattiker: tomgattiker@boisestate.edu

Further information on:

- Submitting to JSCM
- Replication in supply chain management: see Frolich and Dixon (2006) and Pagell (2021).
- Registered reports in general: Center for Open Science or Wiley.
- The use of registered reports for a special issue in the *Journal of Operations Management* entitled Pre-Approved Research Designs for Field Experiments
- A list of Journals already using registered reports.
- The use of registered reports in management: this editorial from *Human Resource Management* is an excellent starting point.
- Templates for the use of registered reports in non-experimental research: secondary data or meta-analysis.

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