








From Pre-design to Operation: A Scoping Review and Bibliometric Analysis of Productivity Metrics Using BIM in Building Projects

Felipe Dutra¹, Carlos Alejandro Diaz Schery^{1,3} , Rodrigo Goyannes Gusmão Caiado^{1,3,*} ,
Marcello Congro^{2,3} , Eduardo Thadeu Corseuil³  and Antonio Márcio Tavares Thomé¹ 

¹Department of Industrial Engineering, Pontifical Catholic University of Rio de Janeiro, Gávea, Rio de Janeiro, Brazil

²Department of Civil and Environmental Engineering, Pontifical Catholic University of Rio de Janeiro, Gávea, Rio de Janeiro, Brazil

³Tecgraf Institute/PUC-Rio, Pontifícia Universidade Católica do Rio de Janeiro, Gávea, Rio de Janeiro, Brazil

© 2025 The Author(s). Published by Bentham Open.

This is an open access article distributed under the terms of the Creative Commons Attribution 4.0 International Public License (CC-BY 4.0), a copy of which is available at: <https://creativecommons.org/licenses/by/4.0/legalcode>. This license permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.



CrossMark

*Address correspondence to this author at the Department of Industrial Engineering, Pontifical Catholic University of Rio de Janeiro, Gávea, Rio de Janeiro, Brazil and Tecgraf Institute/PUC-Rio, Pontifícia Universidade Católica do Rio de Janeiro, Gávea, Rio de Janeiro, Brazil; E-mail: rodrigocaiado@puc-rio.br

Published: April 11, 2025

Cite as: Dutra F, Diaz Schery C, Caiado R, Congro M, Corseuil E, Tavares Thomé A. From Pre-design to Operation: A Scoping Review and Bibliometric Analysis of Productivity Metrics Using BIM in Building Projects. Open Constr Build Technol J, 2025; 19: e18748368379847. <http://dx.doi.org/10.2174/0118748368379847250324051020>



Send Orders for Reprints to
reprints@benthamscience.net

PRISMA 2009 Checklist

Section/topic	#	Checklist Item	Reported on Page #
TITLE			-
Title	1	Identify the report as a systematic review, meta-analysis, or both.	Page 1
ABSTRACT			-
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	Page 1
INTRODUCTION			-
Rationale	3	Describe the rationale for the review in the context of what is already known.	Pages 1-2
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	Page 2
METHODS			-
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	Page 3
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	Page 4
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	Pages 3-4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Pages 3
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	Page 3
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	Pages 3

Section/topic	#	Checklist Item	Reported on Page #
Data items	11	List and define all variables for which data were sought (<i>e.g.</i> , PICOS, funding sources) and any assumptions and simplifications made.	Page 3
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	Not addressed
Summary measures	13	State the principal summary measures (<i>e.g.</i> , risk ratio, difference in means).	Pages 10-11
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (<i>e.g.</i> , I^2) for each meta-analysis.	Page 3
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (<i>e.g.</i> , publication bias, selective reporting within studies).	Page 8
Additional analyses	16	Describe methods of additional analyses (<i>e.g.</i> , sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	Pages 4-8
RESULTS			-
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Page 3
Study characteristics	18	For each study, present characteristics for which data were extracted (<i>e.g.</i> , study size, PICOS, follow-up period) and provide the citations.	Page 9
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Not addressed
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Pages 9-11
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	Pages 9-11
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	Page 12
Additional analysis	23	Give results of additional analyses, if done (<i>e.g.</i> , sensitivity or subgroup analyses, meta-regression [see Item 16]).	Pages 7-8
DISCUSSION			-
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (<i>e.g.</i> , healthcare providers, users, and policy makers).	Pages 9-12
Limitations	25	Discuss limitations at study and outcome level (<i>e.g.</i> , risk of bias), and at review-level (<i>e.g.</i> , incomplete retrieval of identified research, reporting bias).	Page 13
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	Page 13
FUNDING			-
Funding	27	Describe sources of funding for the systematic review and other support (<i>e.g.</i> , supply of data); role of funders for the systematic review.	Page 13

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: www.prisma-statement.org.

DISCLAIMER: The above article has been published, as is, ahead-of-print, to provide early visibility but is not the final version. Major publication processes like copyediting, proofing, typesetting and further review are still to be done and may lead to changes in the final published version, if it is eventually published. All legal disclaimers that apply to the final published article also apply to this ahead-of-print version.