Rahman, M.A., 2026. A review of Building Information Modelling (BIM) research in New Zealand academia from 2010-2025. In: Waidyasekara, K.G.A.S., Jayasena, H.S., Chandanie, H. and Tennakoon, G.A. (eds). *Proceedings of the 14th World Construction Symposium*, 10-11 July 2026, Sri Lanka. pp. 99-109. DOI: https://doi.org/10.31705/WCS.2026.8. Available from: https://ciobwcs.com/papers/

A REVIEW OF BUILDING INFORMATION MODELLING (BIM) RESEARCH IN NEW ZEALAND ACADEMIA FROM 2010-2025

Mohammad Afjalur Rahman[1]

ABSTRACT

Over the past decade, Building Information Modelling (BIM) has become a focal point for both academia and the global construction industry. A vast body of international literature exists, exploring the benefits and challenges of BIM while supporting its adoption within local contexts. Similarly, BIM has gained significant traction within the New Zealand construction industry over the last 15 years; however, academic research specifically tailored to the New Zealand context remains an emerging field. This paper aims to identify and synthesize existing research on BIM within New Zealand academia to evaluate the nature of these publications and the contributions of various institutions. To achieve this, a systematic review was conducted using online databases (such as Scopus and ScienceDirect), complemented by a manual review of New Zealand-based BIM researcher profiles. After the analysis, this study identified 97 articles published during the period of 2010-2025 and divided the articles in six key themes. This study also provides deep insights into the current state of BIM research in New Zealand and serves as a baseline for academia and government to develop effective strategies for future research initiatives.

Keywords: *BIM; New Zealand; Research; Review.*

1. INTRODUCTION

Building Information Modelling (BIM) has been identified as a transformative technology in the global Architecture, Engineering, Construction, and Operation (AECO) industry (Zhao, 2017). BIM is a technological advancement that facilitates the creation of precise virtual models of construction structures embedded with intelligent object data (Azhar, 2011). This intelligent, precise geometric data supports processes throughout construction project's lifecycle from the design stage to the demolition stage. For example, in the design stage, BIM software helps to quickly generate design alternatives with various sustainability analyses (such as energy and water use), coordinates models across different disciplines, provides realistic virtual visualizations and automated documentation, and identifies clashes between a model's components. In the construction stage, BIM's intelligent, object-based geometric data helps cost estimators attain accurate quantities; assists planners in simulating schedules to identify workspace conflicts and select appropriate construction methods; and improves construction safety through realistic visualization of installation processes, construction sequences, and virtual

[1] Lecturer, Building Construction School, Unitec Institute of Technology, New Zealand, arahman@unitec.ac.nz

walkthroughs. For manufacturers, BIM can be utilized to fabricate building components (such as columns, beams, and slabs) directly from the model. Finally, in the post-construction stage, BIM as-built data can be used by owners or facility managers to create maintenance schedules and assist with asset tracking and management.

In the context of construction stakeholders, BIM provides a wide range of benefits across the various stages of a project. In their study, Ghaffarianhoseini et al. (2017) categorized the core benefits of BIM into nine areas: i) technical (higher analytical ability compared to CAD); ii) knowledge management (intelligent data management); iii) standardization (data shareability between different vendor software); iv) diversity management (support for existing building maintenance and management); v) integration (a collaborative platform for clients, designers, and contractors); vi) economics (minimized documentation errors, reduced rework, and fewer unforeseen contractual costs); vii) planning/scheduling (schedule simulation and workspace conflict identification); viii) building life-cycle assessment (LCA) benefits (providing geometric data for use from the design to the post-construction stage); and ix) decision support (through data-sharing models).

The well-documented benefits of BIM have accelerated its adoption by industry practitioners worldwide, including those in New Zealand. In New Zealand, BIM adoption has seen a rise across different industries due to government and construction company initiatives, such as developing common industry guidelines, training, and seminars. Based on a survey in 2021, it was found that 70% of respondents reported using BIM on some or all their projects. The survey also found that the design sector (92% of architects and engineers) remains the primary user of BIM; however, there is increasing adoption in the construction (72%) and facilities management (25%) industries as well. This progress aligns with NZ BIM research and government objectives of creating a standardized framework to improve productivity, reduce waste, and enhance asset management across the industry (BIM Acceleration Committee, 2023; EBOSS, 2021).

This industry trend is mirrored in the academic world, where the subject of BIM has evolved over time and received continuous attention from researchers who advocate for its use in supporting the AECO industry (Zhao, 2017). While BIM adoption is a practical industry phenomenon, the rationale for focusing specifically on academic and research publications is critical for two reasons. First, academic literature serves as a lead indicator for industry research, development, and innovation. Second, academic institutions act as the primary organizations for the research and development of evidence-based frameworks that government and industry bodies (such as the BIM Acceleration Committee) rely upon to develop national standards. By analysing academic publications, this research can help identify BIM research dimensions and trends, and guide future research initiatives.

2. LITERATURE REVIEW

Wen et al. (2021) found that BIM has been analysed by researchers across diverse areas covering both technical and non-technical aspects. Through a cluster analysis of the literature co-citation network, they identified nine core research directions. These include a technical cluster containing Augmented Reality (AR), Geographic Information Systems (GIS), Computer-Aided Design (CAD), engineering design, and model analysis. Additionally, Zhao (2017) identified ten significant co-citation clusters using the loglikelihood ratio algorithm; these include technical clusters such as mobile computing (cloud BIM), laser scanning, interoperability, and artificial intelligence (construction simulation). The technical aspect of BIM research primarily focuses on the integration of BIM with other technologies. For example, Mahdjoubi et al. (2013) researched the integration of BIM with laser scanning, while Wang et al. (2013) integrated BIM with Augmented Reality. Irizarry et al. (2013) combined BIM with Geographic Information System (GIS) to improve supply-chain systems by visualizing the real-time status of materials throughout the supply chain.

On the other hand, non-technical clusters identified by Wen et al. (2021) include construction safety, education, virtual learning, life-cycle assessment, and prefabricated housing production. Zhao (2017) also identified non-technical clusters such as innovation (BIM critical success factors), return on investment, engineering education, safety, and ontology. Beyond these clusters, other notable areas include Green BIM (sustainability and sustainable development), Lean-BIM, knowledge management, project management, implementation, and impacts on cost and scheduling. As an example of non-technical BIM research, Uddin et al. (2021) integrated BIM and local green building materials into a design software (Revit) database to identify the most sustainable designs. Malagnino et al. (2021) conducted a review to understand current progress on the integration of BIM and the Internet of Things (IoT) to enhance sustainability. Tak et al. (2021) developed a framework to integrate BIM with mobile crane operations to improve the safety of heavy-lifting tasks, while Li et al. (2019) developed a framework to support decision-making systems for prefabricated housing production via BIM.

To present the current state of BIM research and further analyse its various branches, many researchers have conducted reviews of existing literature. Among them, Zhao (2017) performed a scientometric review of global BIM literature between 2005 and 2016, analysing 614 journal articles to identify research trends. Similarly, Saka and Chan (2019) reviewed the development of BIM research between 2006 and 2017, analysing 914 journals. Wen et al. (2021) conducted a bibliometric-based visualization analysis of 1,369 journal articles from 2010 to 2019 to understand progress in the field. They found that the period of 2010–2012 was the early stage (less than 100 publications worldwide), after which publications gradually increased to over 100 articles yearly. In the year 2019, the total number of articles exceeded 1,000. On the other hand, Wen et al. (2021) also analysed the geographical distribution of BIM research and found that 50 countries, including New Zealand, have engaged in BIM research in the past 10 years. Among these countries, China takes the lead with 298 publications (until 2019). Chihib et al. (2019) created bibliometric maps of BIM articles (2003–2018), analysing 4,307 articles by 10,636 distinct authors from 314 institutions. Badrinath et al. (2016) also provided a general overview of global trends by analysing 1,000 BIM articles from 65 countries published between 1975 and 2015. Torres et al. (2025) also analysed BIM studies (2008–2024) related to construction schedules and found that China leads by publishing 336 articles.

Global BIM research analysis has helped identify branching patterns and the contributions of different countries, universities, and authors. The scientometric and bibliometric analyses in global BIM research reflect a rapid publications surge from fewer than 100 annually in 2010 to over 1,000 by 2019 (Wen et al., 2021). These studies highlighted the transition from theoretical 'early-stage' discussions to a geographically diverse landscape where China and the US lead in the number of publications (Zhao, 2017; Saka & Chan, 2019).

However, these studies have limitations. Some articles covered only journal papers, while others focused exclusively on top-contributing countries or universities. Consequently, it is difficult to obtain a detailed picture of BIM research for a specific country. Some researchers have conducted country-specific studies; for instance, Li et al. (2020) analysed BIM education and research in China from 2006 to 2020 but limited in terms of scope and level of detail. In terms of New Zealand, none of the previous global BIM review studies provided updated information about New Zealand BIM research contribution and direction. Badrinath et al. (2016) mentioned only 13 articles related to BIM (up to 2016), which offers only a partial view of the New Zealand landscape. To reap the advantages of BIM for the New Zealand construction industry and generate new knowledge, it is crucial to first understand existing studies on the subject. An overview of New Zealand BIM research will help to identify new research gaps and provide opportunities for collaboration.

Therefore, this study aims to identify and highlight all articles related to BIM in New Zealand published between 2010 and 2025. Analysis of global review studies suggests that the majority of BIM articles were published within the last 15 years; thus, this study focuses on the 2010–2025 period. The findings highlight the volume of publications, their subject matter, and the contributions of various New Zealand institutions, including universities, institutes of technology, and polytechnics. As a result, research gaps will be made apparent, assisting current and future researchers in exploring new dimensions of BIM that add value to both New Zealand and global academia and industry.

3. RESEARCH METHOD

This study adopted a systematic review approach, comprising both an electronic database search and a manual institutional review to identify BIM-related publications from 2010 to 2025. To ensure relevance, papers were included only if they focused on BIM applications. For methodological transparency, the systematic review process followed a structured protocol divided into two stages: i) article identification and ii) qualitative thematic analysis. In the article identification stage, first, a systematic review was conducted by using academic database search engines, including Scopus, ScienceDirect, Google Scholar, and ASCE. The search was conducted using the Boolean keywords ["BIM" OR "Building Information Modelling"] AND ["New Zealand"], with the timeframe restricted to 2010–2025. Subsequently, to ensure all relevant publications were captured, specific BIM papers were identified by cross-referencing the names of known New Zealand-based BIM researchers within the search systems. In the manual review, researcher initially audited all academic and research staff profiles within the fields of construction, architecture, civil engineering, the built environment, and architectural technology across New Zealand's eight universities and 16 Institutes of Technology and Polytechnics (ITPs). Based on these initial findings, further details and confirmation were sought by reviewing individual researcher profiles on Google Scholar, ORCID, and ResearchGate. Finally, the papers were reviewed via institutional repositories and other research platforms, such as ResearchGate, Academia.

To refine the initial search results into a robust, credible dataset, explicit inclusion and exclusion criteria were applied. The inclusion criteria's publications were excluded if they were duplicate entries, lacked a primary focus on BIM, or did not explicitly contextually relate to New Zealand research or industry practice. Figure 1 illustrates the screening protocol adopted in this study.

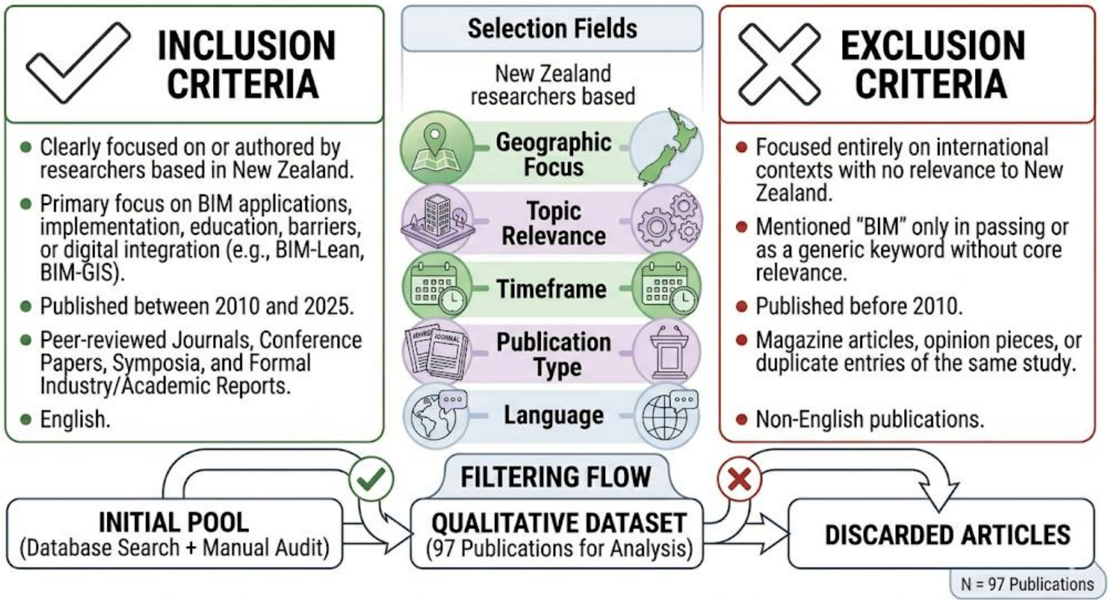

Figure 1: Systematic screening protocol and inclusion/exclusion criteria for the New Zealand BIM literature selection.

After identifying the research papers, researcher analysed the paper and categorised them in six themes. To do so, the researcher has followed Reflexive (inductive) Thematic Analysis, developed by Braun and Clarke (2006). This approach involves a six-phase sequential process that guides the analysis in a rigorous process. These phases are i) familiarisation with the data, ii) code the gathered data, iii) generating initial themes, iv) reviewing themes, v) provide names for the themes and, finally, vi) writing up. Besides during the second phase (coding), the researcher utilized Microsoft Excel to analyse the findings and conclusions of each paper. These codes were then cross compared to identify recurring patterns, which were iteratively grouped into broader themes. This reflexive process ensured that the six themes were implemented to ensure robust analysis.

4. RESULTS

From the electronic and manual reviews, this study has identified 97 articles published by New Zealand researchers from the 8 universities and 16 ITPs in the period of 2010-2025. Figure 2 presents the annual number of publications from 2010 to 2025. The data demonstrates that BIM research in New Zealand has shifted from a minor area of interest into a major academic focus. During the first few years (2010–2014), the annual output remained low, with fewer than five publications per year. However, BIM publications began to accelerate around 2015, peaking in 2019 with 20 publications. This peak period reflects the academic response to government-led BIM initiatives—notably the publication of the NZ BIM Handbook—as well as broader industry adoption. Following this period, there was a gradual decrease in publications, primarily due to a smaller cohort of active researchers. Conversely, since 2022, BIM research has regained momentum, driven by expanding research dimensions incorporating emerging digital technologies such as Blockchain and AI.

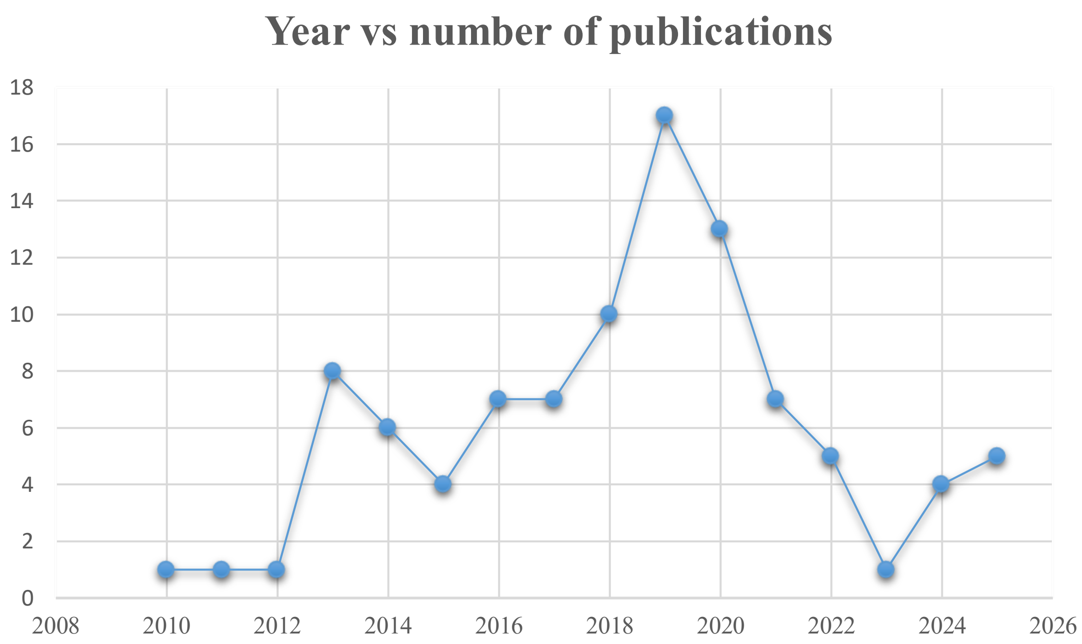

Figure 2: BIM publications number 2010-2025 by New Zealand researchers

Figure 3 shows the classification of articles published from 2010 to 2025. According to the data, conference articles accounted for 47% of the total output (45 out of 97). The number of published journal articles was 38, representing 39% of the total publications. Apart from conference and journal articles, seven symposium papers, six reports, one workshop presentation, and one magazine article were published between 2010 and 2025.

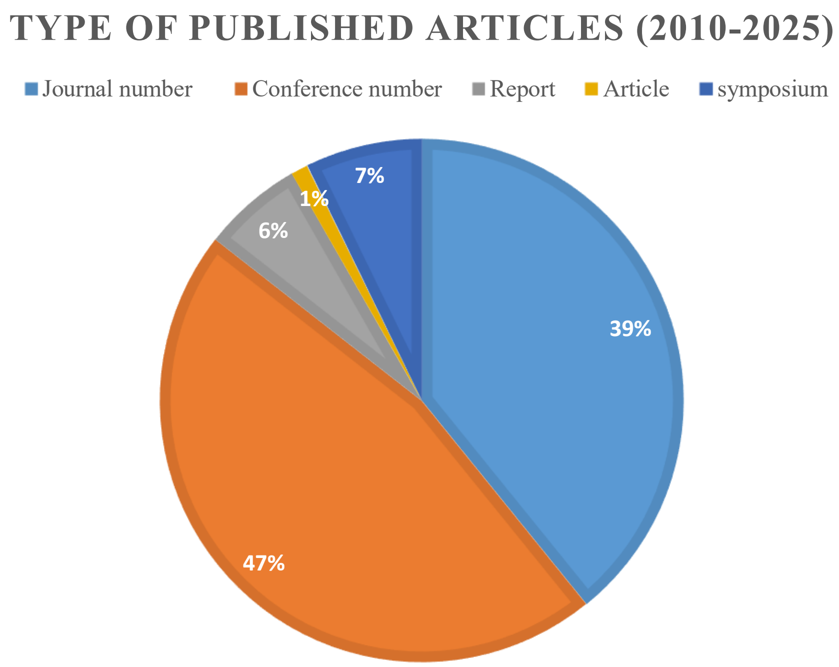

Figure 3: Type of published papers related to BIM from 2010 to 2025.

Figure 4 represents the BIM articles published by the different Universities and ITPs in New Zealand. From the findings, the University of Auckland researchers have published 27 papers (28%) between 2010 and 2025.

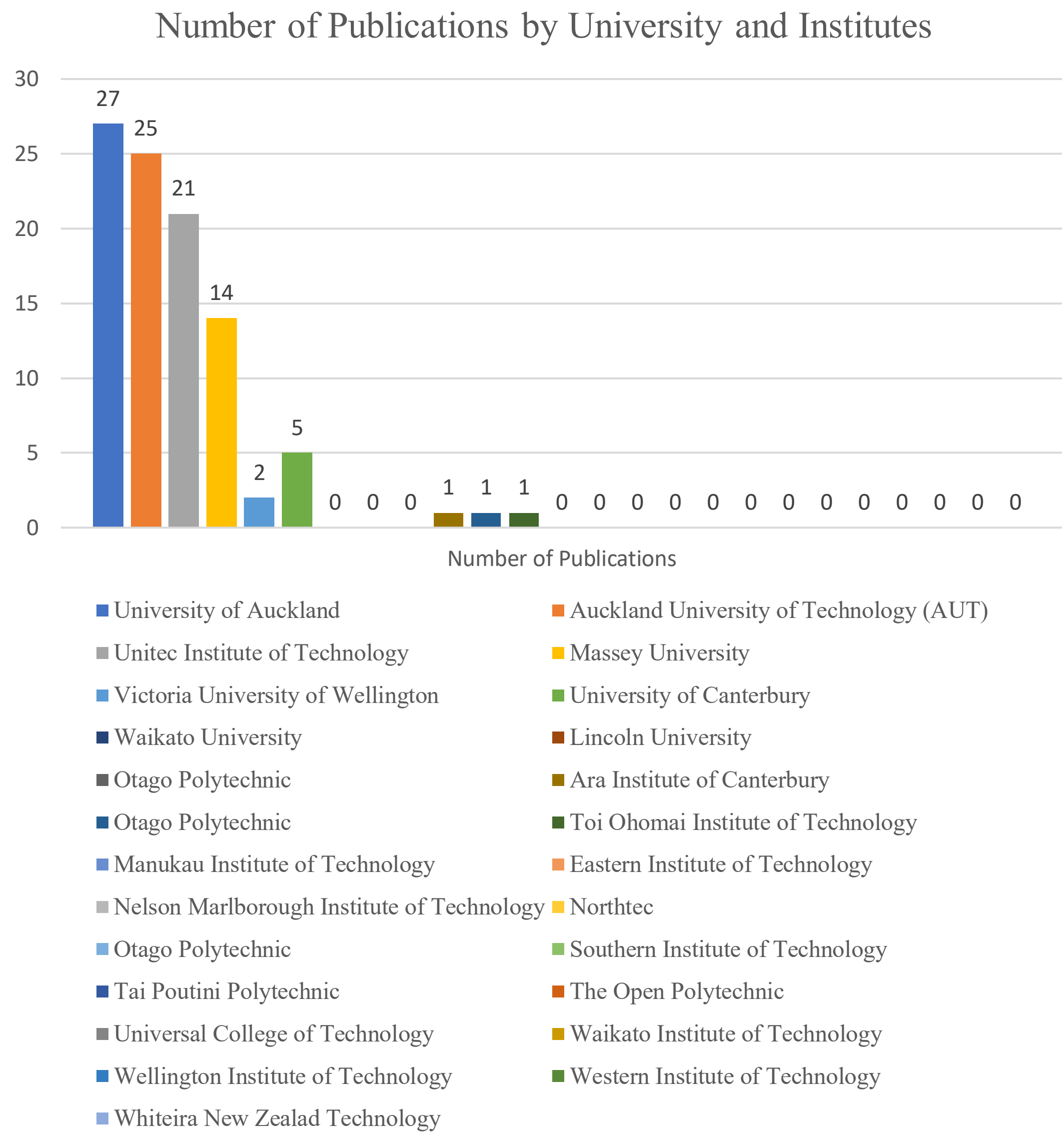

Figure 4: Number of BIM-related papers published by universities and ITPs (New Zealand).

Between 2010 and 2025, researchers from the Auckland University of Technology (AUT) published 25 BIM-related articles, accounting for 26% of the 97 total papers. Over the same period, Massey University researchers published 14 articles (14%), University of Canterbury researchers published 5 (5%), and Victoria University of Wellington published one paper. Because the University of Otago, Lincoln University, and the University of Waikato do not offer courses in construction, architecture, or civil engineering, no publications were produced by these institutions. Conversely, among the 16 Institutes of Technology and Polytechnics (ITPs), academic staff at the Unitec Institute of Technology published 21 BIM articles (22%) between 2010 and 2025. The Ara Institute of Canterbury, Otago Polytechnic, and Toi Ohomai Institute of Technology published one BIM article each during this timeframe.

In summary, New Zealand universities contributed 73 articles (70.81% of the total output) while ITPs accounted for 24 articles (23.28%). Notably, over 75% of these publications originated from Auckland-based universities and institutions, specifically the University of Auckland (UoA), AUT, and Unitec. These three institutions are the largest in New Zealand in terms of student and researcher numbers, which explains their higher volume of BIM research compared to other providers.

5. THEMES

This section aims to further analyse and synthesize the findings by categorizing the published articles into six key themes (Table 1 and Table 2). The longitudinal analysis of BIM-related publications by New Zealand researchers from 2010 to 2025 indicates a clear evolution from foundational explorations of BIM's utility toward highly specialized, multi-dimensional frameworks. This progression can be categorized into three critical dimensions: the socio-technical challenge of adoption, the integration of sustainable and industrialized construction, and the emergence of Industry 4.0 technologies.

Table 1: Theme identification

Theme	Codes	Total Count
1. Adoption & Strategic Frameworks	Quantitative modelling of barriers, SEM adoption models, SME-specific barriers, Regional studies	28 papers
2. Modular & Offsite Construction	Prefabrication, Standardization, and Modularization.	15 papers
3. Lean Construction & Process Productivity	Lean and BIM, Productivity	12 papers
4. Sustainability & Asset Management	Green Star certification, Embodied carbon, Refurbishment of complex buildings, and Energy efficiency (Nd BIM).	18 papers
5. Industry 4.0 & Automation	Technical applications: Blockchain, UAVs, Computer Vision, AI, and Automated code compliance.	10 papers
6. Education, Skills & Professional Roles	Tertiary curriculum development, Soft skills, Impact on quantity surveyors and designers.	13 papers

Among the 97 publications, 28 are related to adoption and strategic frameworks. Early research (e.g., 2011–2014) focused on identifying fundamental barriers and the impact of BIM on professional roles, particularly in quantity surveying and tertiary education. However, the more recent literature (2020–2025) demonstrates a shift toward methodological sophistication. The use of Structural Equation Modelling (SEM) to quantify the relationships between BIM barriers, usage, and awareness suggests that the discourse has moved beyond merely identifying what the barriers are, to understanding the how and why of institutional resistance. The focus on small-to-medium enterprises (SMEs) is particularly significant, reflecting New Zealand's industrial demographic where smaller firms require adoption strategies tailored specifically to local markets.

A significant cluster of research (33 papers combined) links BIM to sustainability (Theme 4) and modular/offsite construction (Theme 2). This intersection addresses New

Zealand's specific socio-economic concerns, such as the housing crisis and environmental sustainability. Publications within the sustainability and asset management theme largely focus on Green Star certification, framing BIM as an essential facilitator for achieving carbon neutrality and energy efficiency. Simultaneously, publications regarding offsite construction and BIM integration during the 2023–2025 period demonstrate a shift toward "industrialized construction." Researchers increasingly view BIM not merely as a design tool, but as the critical digital infrastructure required to manage the complexities of prefabrication and modular assembly across the project lifecycle.

The themes of Lean Construction (Theme 3) and Industry 4.0 (Theme 5) highlight an industry-wide push for productivity gains and technology adoption. The literature increasingly positions BIM not as a standalone tool, but as a critical enabler of industrialized construction. While the 10 papers on automation covering Blockchain, UAVs, and AI—represent a smaller portion of the total volume, they signify the technological frontier of New Zealand research. Furthermore, the integration of Lean philosophy with BIM indicates a mature understanding that digital tools must be supported by efficient processes to deliver value.

Researchers are now aligning BIM-enabled prefabrication (Theme 2) directly with waste reduction (Theme 3) and carbon accounting (Theme 4). Consequently, the shift from "BIM education" in the early 2010s to "Digital Twin" and "Computer Vision" applications in the 2020s suggests that the New Zealand academic community has successfully transitioned from building capacity to leading innovation.

Table 2: Research period and dominant themes

Research period	Dominant Themes	Focused area
2010-2014	Theme 1 (Adoption & Strategic Frameworks), Theme 6 (Education Skills & Professional Roles)	NZ BIM definition and tertiary curriculum.
2015-2019	Theme 4 (Sustainability & Asset Management), Theme 1 (Adoption & Strategic Frameworks)	Linking BIM to Green Star and refurbishment of complex buildings.
2020-2025	Theme 2 (Modular & Offsite Construction), Theme 3 (Lean Construction & Process Productivity), Theme 5 (Industry 4.0 & Automation)	Moving toward AI, Blockchain, and integrated off-site delivery

6. DISCUSSION AND CONCLUSIONS

BIM-related literature has evolved significantly over the last 15 years, both globally and within New Zealand. This study provides a comprehensive review of BIM articles published by New Zealand tertiary education institutions between 2010 and 2025. A total of 97 articles were contributed by five universities and four ITPs. According to the analysis, the University of Auckland was the top contributor overall in terms of total BIM publications, as well as the number of academic researchers engaged in the field. Among the ITPs, the Unitec Institute of Technology was the leading contributor in publishing and driving BIM-related research. These findings indicate that BIM research in New Zealand remains concentrated within a few key institutions, highlighting a clear need and opportunity for cross-institutional collaboration to broaden the research base and increase publication output. In terms of publication types, the volume of conference articles was higher than that of journal papers, symposiums, or reports. This prevalence of conference papers indicates a focus on emerging ideas rather than the long-term, longitudinal validation typically found in peer-reviewed journals. Additionally, 2019 emerged as the most productive year for New Zealand BIM researchers, yielding the highest number of articles. This spike demonstrates a clear correlation between government-led digitalization initiatives and academic output, proving that policy and industry engagement serve as primary catalysts for domestic BIM research.

Finally, this study synthesizes the landscape of BIM research in New Zealand academia over a transformative 15-year period. The findings confirm that the field has achieved a significant level of maturity, progressing from basic 3D modelling discussions to complex, integrated frameworks that leverage Lean philosophy, sustainable development, and automated technologies. This shift from tool-centric (3D) to process-centric (Lean/automation) research demonstrates a fundamental maturity in New Zealand's academic focus, reflecting a broader movement toward holistic lifecycle management. Furthermore, the research reveals a strong alignment between academic investigation and New Zealand's unique industry requirements, particularly regarding the digitalization of SMEs and the technology-driven construction sector.

Looking forward, a critical need remains for research focusing on the human-centric and cultural shifts required for total digital integration across the supply chain. Future studies can investigate the transformations (behavioural and social) needed to overcome technological barriers across the supply chain, establish collaborative procurement models, and manage workforce upskilling. In addition, SMEs form the backbone of the New Zealand construction industry, research should focus on practical, empirical frameworks designed for small-scale deployment that accommodate specific financial and resource constraints. Finally, there is an urgent need for longitudinal validation and real-world field implementation research to quantify exact productivity gains and return on investment (ROI) on active construction sites. By addressing these interconnected human, organizational, and empirical gaps, future research can provide the robust evidence base required to effectively enhance the long-term productivity and resilience of New Zealand’s built environment.

7. REFERENCE

Azhar, S. (2011). Building Information Modelling (BIM): Trends, benefits, risks, and challenges for the AEC industry. *Leadership and Management in Engineering*, *11*(3), 241–252. https://doi.org/10.1061/(ASCE)LM.1943-5630.0000127

Badrinath, A. C., Chang, Y. T., & Hsieh, S. H. (2016). An overview of global research trends in BIM from analysis of BIM publications. In *Proceedings of the 16th International Conference on Computing in Civil and Building Engineering* (pp. 106–140). Osaka University.

BIM Acceleration Committee. (2023). *The New Zealand BIM handbook* (4th ed.). Building-Performance. https://www.biminnz.co.nz/nz-bim-handbook

Chihib, M., Salmerón-Manzano, E., Novas, N., & Manzano-Agugliaro, F. (2019). Bibliometric maps of BIM and BIM in universities: A comparative analysis. *Sustainability*, *11*(16), Article 4398. https://doi.org/10.3390/su11164398

EBOSS. (2021). *BIM in New Zealand: 2021 industry survey report*. https://www.eboss.co.nz/bim-in-nz/

Ghaffarianhoseini, A., Tookey, J., Ghaffarianhoseini, A., Naismith, N., Azhar, S., Efimova, O., & Raahemifar, K. (2017). Building Information Modelling (BIM) uptake: Clear benefits, understanding its implementation, risks and challenges. *Renewable and Sustainable Energy Reviews*, *75*, 1046–1053. https://doi.org/10.1016/j.rser.2016.11.083

Irizarry, J., Karan, E. P., & Jalaei, F. (2013). Integrating BIM and GIS to improve the visual monitoring of construction supply chain management. *Automation in Construction*, *31*, 241–254. https://doi.org/10.1016/j.autcon.2012.12.005

Li, J., Afsari, K., Li, N., Peng, J., Wu, Z., & Cui, H. (2020). A review for presenting Building Information Modelling education and research in China. *Journal of Cleaner Production*, *259*, Article 120885. https://doi.org/10.1016/j.jclepro.2020.120885

Li, X., Shen, G. Q., Wu, P., & Yue, T. (2019). Integrating building information modelling and prefabrication housing production. *Automation in Construction*, *100*, 46–60. https://doi.org/10.1016/j.autcon.2018.12.024

Mahdjoubi, L., Moobela, C., & Laing, R. (2013). Providing real-estate services through the integration of 3D laser scanning and Building Information Modelling. *Computers in Industry*, *64*(9), 1272–1281. https://doi.org/10.1016/j.compind.2013.09.006

Malagnino, A., Montanaro, T., Lazoi, M., Sergi, I., Corallo, A., & Patrono, L. (2021). Building Information Modelling and Internet of Things integration for smart and sustainable environments: A review. *Journal of Cleaner Production*, *314*, Article 127716. https://doi.org/10.1016/j.jclepro.2021.127716

Saka, A. B., & Chan, D. W. (2019). A global taxonomic review and analysis of the development of BIM research between 2006 and 2017. *Construction Innovation*, *19*(4), 565–596. https://doi.org/10.1108/CI-12-2018-0097

Tak, A. N., Taghaddos, H., Mousaei, A., Bolourani, A., & Hermann, U. (2021). BIM-based 4D mobile crane simulation and onsite operation management. *Automation in Construction*, *128*, Article 103766. https://doi.org/10.1016/j.autcon.2021.103766

Torres, K., Sánchez, O., Castaneda, K., Noguera, M., Carrasco-Beltrán, D., Vidal-Méndez, S., & Lozano-Ramírez, N. E. (2025). Exploring the knowledge structure of Building Information Modelling (BIM) adoption in construction scheduling: A bibliometric analysis from 2008 to 2024. *Ain Shams Engineering Journal*, *16*(8), Article 103446. https://doi.org/10.1016/j.asej.2024.103446

Uddin, M. N., Wei, H. H., Chi, H., Ni, M., & Elumalai, P. (2021). Building Information Modelling (BIM) incorporated green building analysis: An application of local construction materials and sustainable practice in the built environment. *Journal of Building Pathology and Rehabilitation*, *6*(1), Article 25. https://doi.org/10.1007/s41024-021-00120-w

Wang, X., Love, P. E., Kim, M. J., Park, C. S., Sing, C. P., & Hou, L. (2013). A conceptual framework for integrating Building Information Modelling with augmented reality. *Automation in Construction*, *34*, 37–44. https://doi.org/10.1016/j.autcon.2012.10.012

Wen, Q. J., Ren, Z. J., Lu, H., & Wu, J. F. (2021). The progress and trend of BIM research: A bibliometrics-based visualization analysis. *Automation in Construction*, *124*, Article 103558. https://doi.org/10.1016/j.autcon.2021.103558

Zhao, X. (2017). A scientometric review of global BIM research: Analysis and visualization. *Automation in Construction*, *80*, 37–47. https://doi.org/10.1016/j.autcon.2017.04.002