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Research Article

AI in ANZ Construction Job Posts: A Detailed Five-Year Analysis (2021-2025)

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Abstract

The construction industry faces an urgent imperative to adopt Artificial Intelligence (AI) and Machine Learning (ML) capabilities to remain competitive and address persistent productivity challenges, yet empirical evidence of this workforce transformation has remained elusive. This research provides the first systematic analysis of AI skills integration in the Australia and New Zealand (ANZ) construction sector through comprehensive examination of job advertisement data from 2021-2025. Analysis of 304 AI/ML-specific construction job postings reveals explosive growth, with demand accelerating at a remarkable 67.3% compound annual growth rate—increasing nearly five-fold from 25 postings in 2021 to 117 in 2024, including a dramatic 54% surge in the final year alone. The findings expose critical workforce transformation patterns: Python programming dominates technical requirements (comprising over 25% of all AI-related skills), while Construction Project Management represents 40% of domain expertise demands, indicating integration of AI capabilities within traditional construction frameworks rather than replacement. Geographic analysis reveals striking concentration, with Sydney and Melbourne capturing over half of all opportunities, yet Regional Queensland unexpectedly outperforms major capital cities, challenging conventional urban-centric adoption assumptions. Job function analysis demonstrates that AI integration spans from Administration Entry-Level positions (42 postings) to specialized Engineering roles across multiple seniority levels, signaling comprehensive workforce restructuring rather than niche specialization. These unprecedented insights provide construction education providers, industry leaders, and policymakers with essential empirical foundations for urgent workforce development strategies, revealing that AI adoption in construction has moved beyond theoretical potential to become a rapidly expanding employment reality requiring immediate strategic response.

Keywords: Artificial intelligence, Construction industry, Workforce transformation, Digital skills, Machine learning integration, Education

Highlights

- AI job demand in ANZ construction exploded 67.3% annually, rising from 25 to 117 postings.
- Python programming dominates AI skills at 25%, integrated with traditional project management.
- Entry-level admin roles lead AI hiring, signaling workforce transformation across all levels.

1 Introduction

The market for Artificial Intelligence (AI) in the construction sector is valued at USD 3.93 billion (2024) and is projected to grow by over 570%, USD 22.68 billion, by 2032. This annual growth rate (CAGR) of approximately 25% (Fortune Business Insights, 2025) is unparalleled with any other external market force for the sector. Evidence suggests that AI offer transformative opportunities for the construction sector through improved operational efficiency and optimization, potentially boosting corporate profitability by an average of 38% by 2035 across major industries including construction (Purdy and Daugherty, 2017). These profitability gains would stem from efficiencies in automated project management and delivery, machine learning-based safety protocols, and resource optimization (Rabbi and Jeelani, 2024). Adoption of AI in construction continues to accelerate across global markets. A recent report, across six Asia Pacific markets (Japan, Singapore, Australia, India, Malaysia, and Hong Kong), reveals that 37% of respondents currently utilize AI and ML technologies. An additional 33% plan to implement these technologies in the future, while 24% reported no current use or implementation plans, and 6% indicated no awareness of such technologies (Rumbens, 2025). Although AI adoption is accelerating across the Asia Pacific region, particularly in Australia and New Zealand (ANZ), and is poised to penetrate the entire project lifecycle through efficiency gains, cost reduction, safety improvements, and sustainability contributions, a major barrier persists: the lack of technical and practical AI skills required for implementing AI-enabled solutions. (Rumbens, 2025). This skills gap represents a critical challenge for construction companies attempting to implement AI technologies. Prioritizing the hiring of future skills or upskilling current workforce to unlock AI's full potential and maintain competitiveness is necessary for a future construction (Commonwealth of Australia, 2021; Rumbens, 2025). AI is reshaping the skills required by employers (Regona et al., 2024). This transformation necessitates that employers adapt their recruitment strategies to acquire the emerging competencies. However, such individual employer responses may prove insufficient without broader industry-wide skills analysis and coordination.

This paper responds to a clear research gap: the extent to which construction firms are procuring AI and ML skills remains poorly understood. The construction sector's adoption of these emerging technologies requires workforce capabilities that have not been systematically examined. This paper rigorously examines job advertisement datasets to identify emerging workforce trends, particularly regarding projected demand for AI specialists within the construction sector. This evidence-based analysis provides crucial insights for the sector, particularly regarding whether construction firms can secure the workforce capabilities needed to deliver anticipated growth rates and address persistent productivity challenges. Additionally, this research establishes essential foundations for developing an AI and ML competency framework. Such a framework would serve both construction firms and education providers by aligning training initiatives with the sector's demand for these specialized skills. (Hajkowicz et al., 2020; National Skills Commission, 2022). Furthermore, this analysis provides valuable insights for construction firms planning workforce strategies to support AI adoption and implementation initiatives.

2 Contextual background

Despite its significant share in most national economies, the construction industry is known for being among the least digitized sectors. This can result in widespread challenges such as suboptimal productivity (Hosseini et al., 2021). AI is considered a transformative technology, creating productivity

through time-saving through reduced rework, finding information, drafting, or other lower complexity and repetitive tasks (Najafi et al., 2025). Sources indicate that 38–45% of jobs requiring medium to low education face a high risk of automation by the mid-2030s (Abioye et al., 2021). This, however, should not be conflated with jobs loss; instead, the adoption of AI and related technologies is anticipated to generate new employment opportunities. These new roles may include positions such as construction AI researchers, engineers, trainers, and testers, needed to develop, deploy, and manage AI-enabled systems which can be from reskilled displaced workers (Regona et al., 2024). Research studies demonstrate that AI capabilities for construction activities continue to expand, emphasizing the critical importance of personnel with skills to effectively utilize and apply these technologies while leveraging their domain expertise (Nyqvist et al., 2024). This evolution necessitates harnessing the collaborative potential of AI and human expertise through models where AI enhances human performance in construction tasks (Zhang et al., 2024). Consequently, recent studies have identified emerging demand for new AI-related roles in the construction industry, reflecting the sector's recognition of AI as a transformative capability requiring specialized workforce competencies.

Industry reports predict rising demand for "AI specialists, data analysts and robotics technicians" within construction organizations — rare roles a decade ago (Malik, 2025). AI transformation leads organizations to recruit for new tech-enabled positions. This illustrates a broader trend: construction firms are restructuring their teams to include more tech-focused roles that support AI and automation deployment, ensuring that technological benefits are fully realized on projects (Purdy and Daugherty, 2017). As organizations become more reliant on AI, they actively hire for specialized positions such as agent workflow architects, who are responsible for designing, managing, and optimizing workflows involving teams of AI agents. Industry forecasts indicate substantial growth in demand for AI and machine learning specialists, big data specialists, and fintech engineers. While these represent general market trends, they are indicative of the specialized technical roles that should increasingly populate the construction technology sphere (Leopold, 2025).

The literature predicts a transformative shift in construction employment driven by AI adoption, characterized by workforce evolution and the creation of specialized AI-enabled roles. While industry reports indicate this transformation is underway, and academic research establishes theoretical foundations, empirical evidence of how construction companies are preparing for and managing this transition remains limited. The reality of workforce transformation within the construction sector requires systematic investigation. To address these knowledge gaps, this study examines the extent of AI skills demand and explores the evolving landscape of AI-related employment within the Australian and New Zealand construction sectors. The following section outlines the methodological framework adopted to analyze job advertisement trends and gather insights from industry practitioners operating in the ANZ market.

3 Research Methods and Design

This study utilized Lightcast, a labor market analytics company, to evaluate job postings data across Australia and New Zealand (Lightcast, 2024). The dataset provided comprehensive coverage of construction industry employment trends from 2021 to early 2025. Individual job postings were analyzed for AI-related keywords using Lightcast's predefined skill categories and filtering system. The platform's occupational taxonomy and company information enabled systematic classification and analysis of construction industry positions. Data extraction focused specifically on roles requiring artificial intelligence and machine learning skills. The analysis extended to examining related skills

that frequently appeared alongside AI competencies, providing insights into the broader skill requirements for AI-enabled construction roles.

4 Results- Key Findings

Figure 1 illustrates job postings in the construction industry across ANZ containing AI keywords from 2021 to early 2025. The data reveals a distinct upward trajectory with two phases of growth. Initial growth was gradual, with postings increasing from 25 in 2021 to 67 in 2022, then reaching 76 in 2023. However, 2024 demonstrated a significant acceleration, with postings surging to 117—representing a 54% increase from the previous year and nearly a five-fold increase from 2021 levels. The trend line clearly indicates this accelerating demand for AI-related skills within the construction sector. The 2025 data represent early-year postings only (15 postings), providing limited insight into the full-year trajectory. While this partial data suggests continued industry engagement with AI competencies, comprehensive annual trends for 2025 cannot be established from this incomplete dataset. The research team also calculated the average annual growth rate of job postings requiring AI and ML skills in the construction industry across New Zealand and Australia from 2021 to 2024. Compound Annual Growth Rate (CAGR) was employed to account for compounding effects over the period. The data revealed an increase from 25 postings in 2021 to 117 in 2024.

$$\left[\left(\frac{117}{25}\right)^{\frac{1}{3}} - 1\right] \times 100 \qquad \text{Equation 1}$$

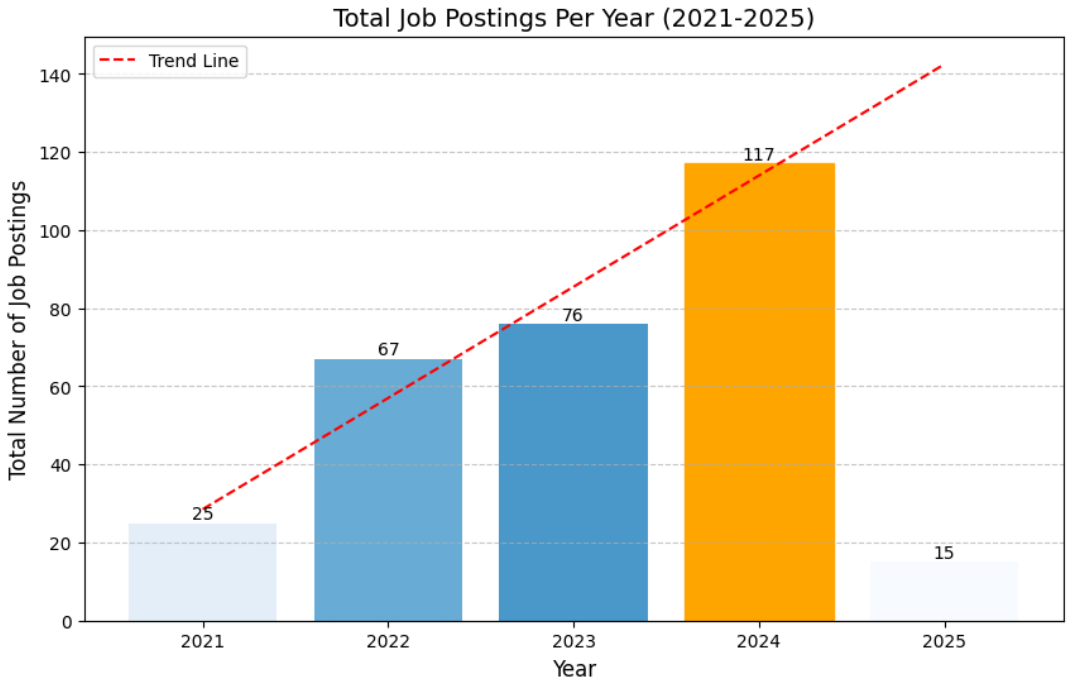

Figure 1. AI-related job postings in ANZ construction sector (2021-2025)

The CAGR, computed as Equation 1, yielded approximately 67.3%. This metric, corroborated by the upward slope of the trend line in the bar chart, indicates a sustained increase in demand for AI and ML expertise in the construction sector. However, there were clear fluctuations in year-over-year growth rates —168% (2021-2022), 13.43% (2022-2023), and 53.95% (2023-2024). These fluctuations highlight potential contextual factors on hiring patterns. Technological integration processes and prevailing

economic conditions can create cycles of rapid adoption followed by stabilization and subsequent renewed growth in the industry.

Figure 2 illustrates the geographic distribution of AI-related job postings across Australian states, territories, and regions, including New Zealand. Sydney (75) and Melbourne (63) emerge as the dominant hubs for AI-related construction employment, collectively accounting for over half of all postings. Regional Queensland (42) ranks third, notably outperforming several capital cities and challenging the typical urban-regional divide. Among other Australian capitals, Perth (28) and Brisbane (26) show moderate demand, followed by Regional NSW (18), New Zealand (16), and Regional WA (11). Smaller markets include Darwin (7), Regional VIC (3), Regional TAS (2), Canberra (2), Adelaide (1), and Regional SA (1). The distribution reveals a complex geographic pattern where Australia's eastern seaboard dominates, but Regional Queensland's strong performance (42 postings) demonstrates that AI integration in construction extends beyond major urban centers in specific markets. Nevertheless, most regional areas remain significantly underrepresented, suggesting that while exceptions exist, AI adoption in construction maintains a predominantly metropolitan focus.

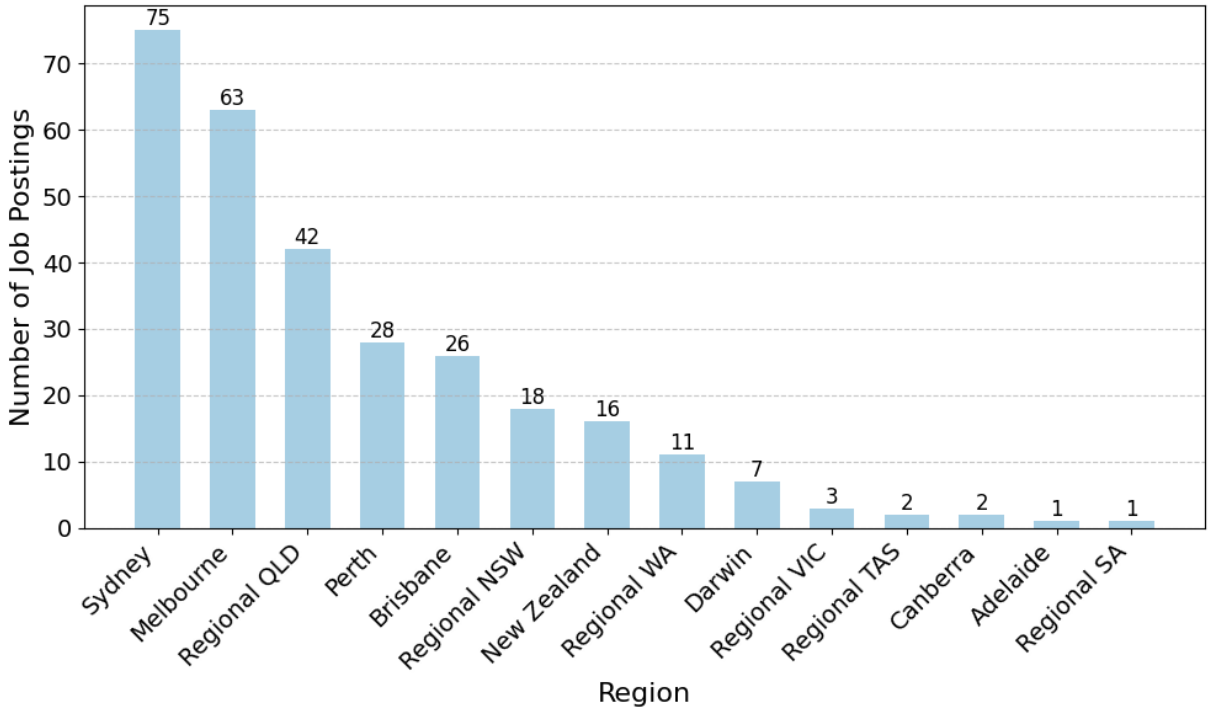

Figure 2. Geographic distribution of AI-related construction job postings across ANZ

4.1 Changing Landscape of AI Skill Requirements

The analysis of AI-related technical skills in construction job postings, as in Figure 3, revealed Python as the dominant technical skill, comprising over 25% of all AI-related skill mentions. This substantial lead over other skills indicated the industry's strong preference for Python-based development environments for AI applications in construction. Machine Learning followed as the second most demanded skill, while more specialized AI capabilities such as TensorFlow and predictive analytics appeared with less frequency. This skill distribution suggested that the construction industry is primarily seeking professionals with foundational programming and general machine learning knowledge rather than expertise in specific AI frameworks or specialized applications. These findings have significant implications for the construction labor market. The dominance of Python and general Machine Learning skills indicates that the industry is still in an early adoption phase of AI technologies,

focusing on basic implementation rather than advanced applications. For educational institutions and training providers, this suggests the need to prioritize Python programming and fundamental Machine Learning concepts in construction technology curricula. For professionals looking to enter or advance in digitalized construction careers, developing proficiency in Python appears to be the most valuable technical skill, potentially offering a higher return on investment than specializing in niche AI frameworks. As the construction industry continues its digital transformation, the demand for specialized AI skills can be expected to grow, but currently, strong fundamentals in Python programming and Machine Learning principles remain the most marketable technical competencies in this sector.

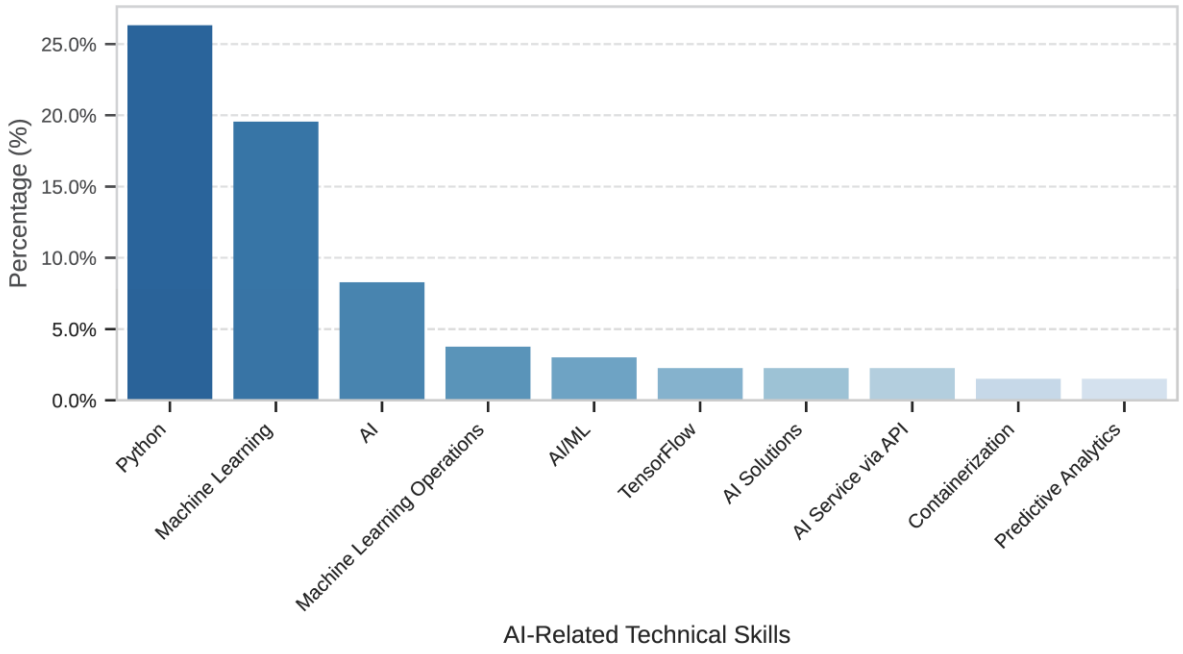

Figure 3. Distribution of AI-related technical skills in construction job postings

The domain skills chart in Figure 4 reveals a pronounced emphasis on Construction Project Management, which dominates at nearly 40% of all domain skills mentioned in job postings, significantly outpacing all other skill categories. This dominance underscores the critical importance employers place on comprehensive project management capabilities within the construction industry. Facility Maintenance emerges as the second most prevalent domain skill at approximately 10%, while Automation Interfacing and Protocols and Construction Industry knowledge each represent about 5% of the domain skills. The remaining categories, including Civil Construction Standards, Construction Safety Management, and more specialized domains like Sustainability Management and Heavy Fitting, each account for less than 5% of the skills mentioned. When examined alongside the AI-related technical skills analysis, this distribution highlights an important industry trend: while employers strongly prioritize traditional construction management expertise, there appears to be growing integration of digital and AI capabilities within these conventional construction domains. The presence of Automation Interfacing and Protocols among the top domain skills suggests an emerging focus on digitalization and smart construction technologies. This indicates that the construction industry is beginning to incorporate AI and advanced technical skills within the context of established construction management frameworks rather than treating them as separate specializations. For professionals in the construction sector, this suggests the ideal skill profile increasingly combines

strong project management foundations with emerging technical competencies, particularly programming skills like Python and fundamental understanding of machine learning concepts.

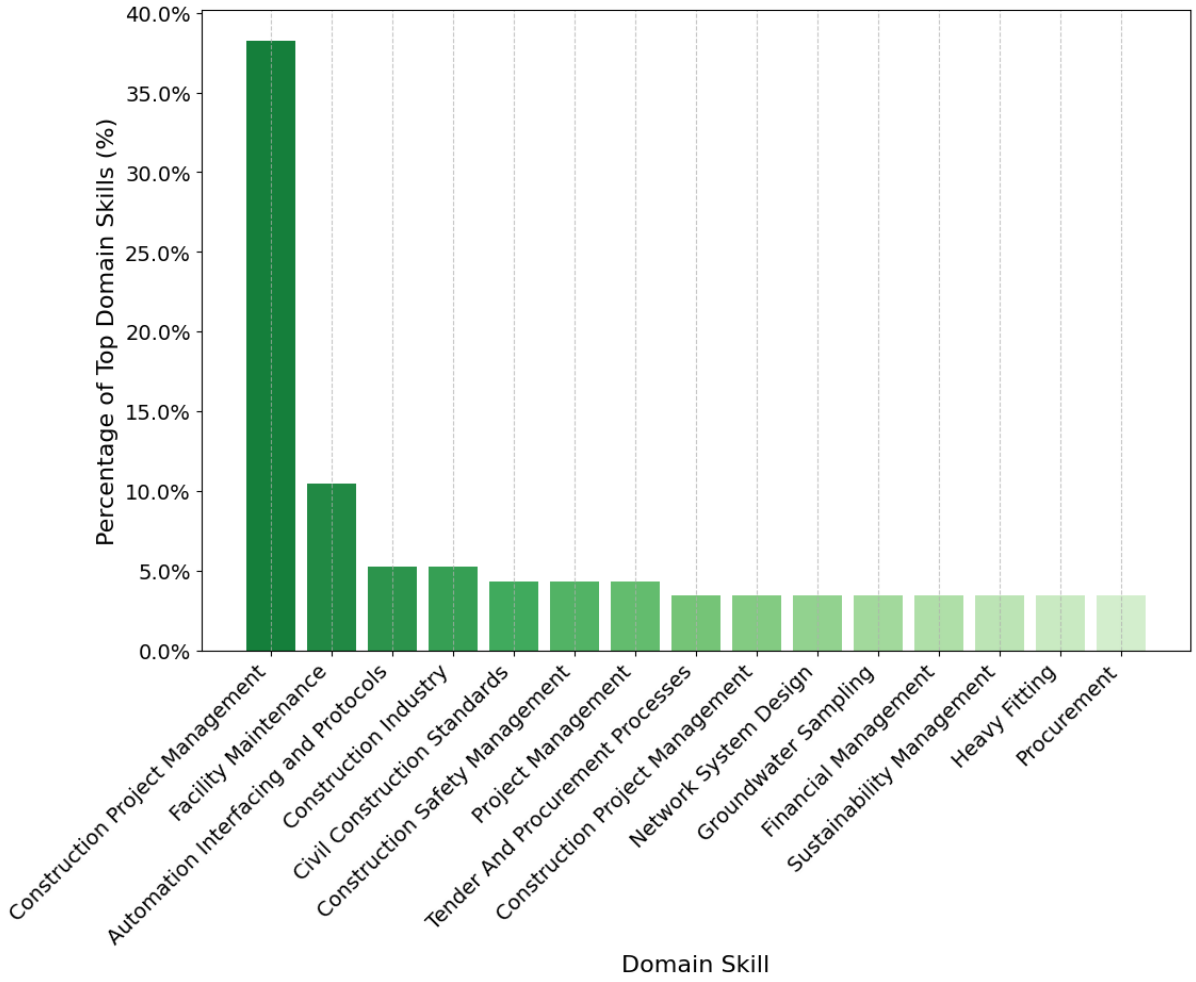

Figure 4. Domain skills distribution in AI-related construction job postings

4.2 AI Skills Distribution by Job Function and Seniority

Figure 5 visualizes the distribution of AI-related job postings across job functions and seniority levels through a heatmap analysis. The data reveals distinct concentration patterns, with Administration Entry-Level positions (42) representing the highest demand, followed by Data & Analytics Specialist roles (24) and General Management Manager positions (24). Engineering demonstrates strong representation across multiple seniority levels, with Engineering Specialist (19), Engineering Manager (15), and Engineering Entry-Level (9) positions showing consistent demand. To facilitate this analysis, approximately 160 unique job titles were systematically categorized along two dimensions: primary function ('Nature of Work') and hierarchical level ('Seniority'). The 'Nature of Work' classification grouped titles into functional categories including Administration, Construction & Trades, Data & Analytics, Engineering, Environmental & Safety, Finance, General Management, HR, IT & Technology, Marketing, and Project Management. The 'Seniority' classification organized positions into experience levels: Entry-Level, Specialist, Manager, and Director. The heatmap reveals notable gaps in Director-level positions across most functional areas, with only minimal representation in Data & Analytics Director (2) and Project Management Director (2). Similarly, several functional areas show limited activity at certain seniority levels, such as Customer Service & Sales and Environmental & Safety. The

distribution indicates that AI integration in construction primarily manifests through administrative entry-level roles, technical specialist positions, and management-level oversight, with engineering disciplines demonstrating the most consistent demand across seniority levels.

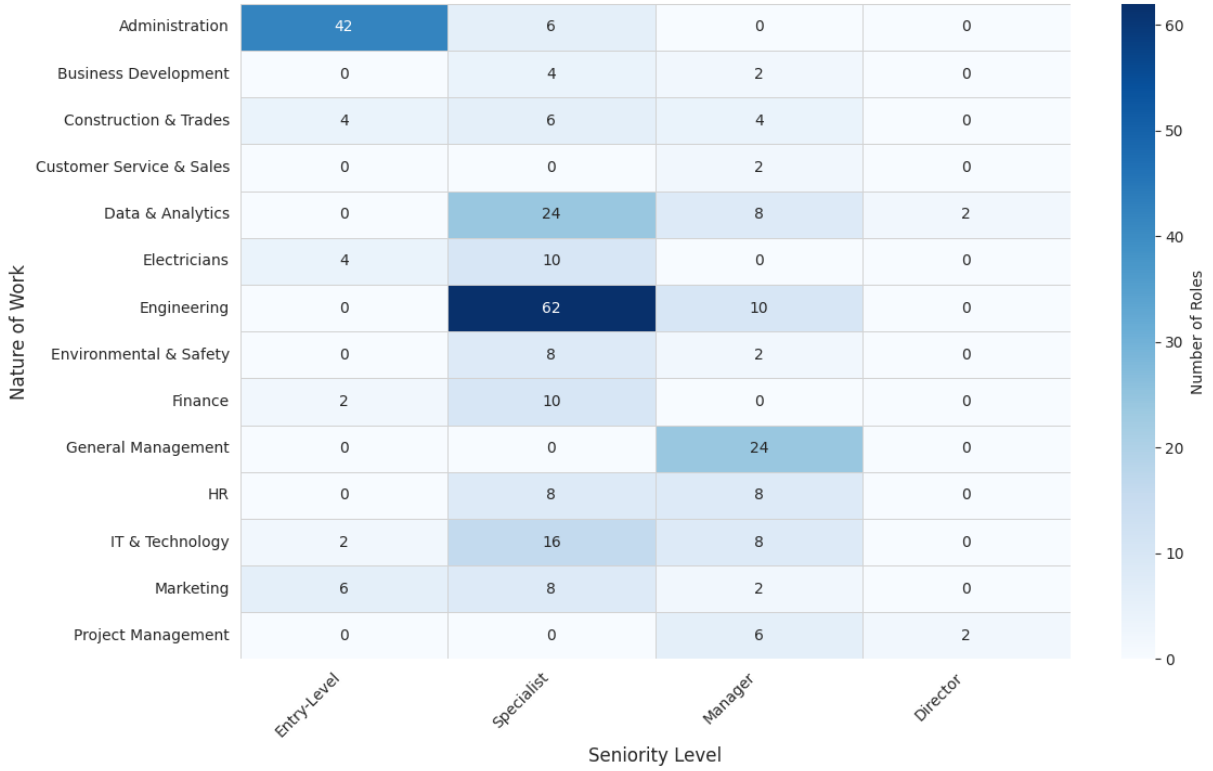

Figure 5. Heatmap of AI-related job postings by function and seniority level,

5 Discussion and Conclusion

This research provides the first systematic analysis of AI skills demand within the ANZ construction sector, offering critical empirical evidence to inform workforce development strategies. The findings reveal a construction industry undergoing rapid digital transformation, with AI-related job postings demonstrating a remarkable 67.3% compound annual growth rate from 2021 to 2024. This accelerating demand trajectory, culminating in 117 postings in 2024 compared to just 25 in 2021, signals an urgent imperative for both industry and educational stakeholders to respond decisively to evolving workforce requirements. The analysis exposes significant implications for the education sector's role in construction workforce development. The dominance of Python programming (comprising over 25% of technical skill mentions) and fundamental machine learning competencies indicates that educational institutions must prioritize these foundational capabilities in construction technology curricula. Unlike specialized AI frameworks, the industry's current focus on basic programming and general ML concepts suggests that educational providers can effectively address near-term skills gaps through targeted curriculum modifications. However, the integration of these technical competencies with traditional construction management expertise—evidenced by Construction Project Management representing 40% of domain skills—requires educational institutions to develop interdisciplinary programs that bridge technological capabilities with established construction knowledge. The geographic concentration of AI adoption, with Sydney and Melbourne accounting for nearly half of all postings, presents both challenges and opportunities for educational planning. While metropolitan focus reflects current market realities, Regional

Queensland's exceptional performance (42 postings) demonstrates potential for distributed AI integration, suggesting educational institutions across diverse geographic markets should prepare for expanding demand. For the construction industry, these findings indicate an immediate need for strategic workforce restructuring and accelerated skills development initiatives. The predominance of Administration Entry-Level positions (42 postings) and consistent Engineering demand across seniority levels suggests that AI integration is occurring through both new hiring strategies and evolution of existing roles. Construction firms must urgently develop comprehensive upskilling programs for current personnel while simultaneously restructuring recruitment strategies to attract AI-capable professionals. The 54% year-over-year increase from 2023 to 2024 demonstrates that competitive advantage increasingly depends on rapid adoption of AI capabilities. This research's novel contribution lies in providing the first quantitative assessment of AI skills demand patterns in ANZ construction, moving beyond theoretical discussions to evidence-based workforce planning. The systematic analysis of 304 job postings offers unprecedented insights into the intersection of traditional construction competencies and emerging technological requirements. These findings establish essential foundations for developing targeted AI competency frameworks that align educational provision with industry demand.

The implications extend beyond immediate skills development to fundamental questions of industry preparedness. With AI market projections indicating continued exponential growth and the demonstrated acceleration in skills demand, construction stakeholders face a critical window for proactive response. Educational institutions must rapidly expand AI-focused construction programs, while industry leaders must immediately begin restructuring teams and developing internal capabilities. The evidence suggests that organizations delaying these adaptations risk significant competitive disadvantage as AI integration becomes standard practice rather than innovative differentiation. Future research should extend this analysis to examine skills demand evolution in real-time, investigate the effectiveness of educational interventions in addressing identified gaps, and explore the relationship between AI skills acquisition and organizational performance outcomes in construction contexts. The methodology established in this study provides a replicable framework for ongoing monitoring of workforce transformation as the construction industry continues its digital evolution.

Data Availability Statement

The data supporting the conclusions of this study are available upon reasonable request.

Conflicts of Interest

The authors declare no conflict of interest.

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