

Unpacking Demographics-Based Impediments to Professionalization in the South African Built Environment

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Abstract: Despite South Africa's unique demographics, shaped by a history of apartheid and ongoing inequality, its built environment has so far been unable to extricate itself from its inglorious past. This portends that the quality and impact of infrastructure developed concentrates on the few at the expense of the many. This study delves into the multifaceted challenges that impede the full realization of an inclusive built environment sector by reviewing extant studies on these issues through a mixed review and blending this with statistical evidence from document analysis on professional development in the South African built environment. We explore how diversity factors intersect to create structural impediments in the pursuit of professionalization. The findings underscore the critical importance of inclusion in the built environment profession, potential policy and institutional changes required to address these challenges, and the web of demographic factors influencing access, opportunities, and success within the built environment.

Keywords: demographics; diversity; gender; race; age; professionals; built environment; construction industry; South Africa

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1. Introduction

In many countries, professionalization is a key driver of quality and excellence within various fields [1,2]. It protects the interests of practitioners and the public by ensuring that those who provide services possess the necessary knowledge, skills, and ethical standards. However, in South Africa, professionalization faces unique and significant challenges, primarily driven by demographics [3,4]. Demographics-based impediments within the South African built environment are pervasive, affecting individuals from historically marginalized groups, particularly concerning race, gender, and socioeconomic status. These impediments create structural barriers that obstruct the full realization of a professional and inclusive built environment sector. The consequences of these barriers are far-reaching, as they limit access to the sector, stifle diversity, and perpetuate inequalities. The South African built environment remains largely a bastion of privilege, where opportunities and outcomes disproportionately favour a select few at the expense of the many [5,6].

The South African built environment encompasses various professions, ranging from architecture and engineering to urban planning and construction management. Within this sector, the concept of professionalization assumes a pivotal role. Professionalization refers to developing and recognising specific standards, qualifications, and ethical norms that guide individuals in their respective fields. It also entails the establishment of formalized pathways for individuals to enter, progress, and excel within their chosen professions [7,8].

This study seeks to unpack and analyse these demographics-based impediments and their implications for professionalization within the South African built environment. It aspires to shine a light on the factors that contribute to this predicament, to understand

the historical context that gave rise to these challenges, and to propose potential solutions and policy changes to address them. By doing so, it aims to contribute to a broader conversation on diversity, inclusion, and professionalization in the South African context, offering insights that may have implications for policy, practice, and future research. The importance of this study is underscored by the critical role that the built environment plays in shaping the physical and social landscapes of South Africa. Infrastructure development, urban planning, and architectural design have far-reaching implications for South Africa's diverse population's well-being, livelihoods, and quality of life. Therefore, ensuring that the built environment sector is accessible, representative, and responsive to the needs of all South Africans is not just a matter of professional interest but a matter of national significance. The rationale for this study is deeply rooted in the imperative to understand, address, and contribute solutions to the demographics-based impediments that hinder the full realization of a professional and inclusive built environment sector in South Africa. The current body of research, while informative, falls short in addressing the interplay between socioeconomic status and demographics-based impediments, an historical context is also avoided as this has been covered by previous studies [4,7]. The advantages of this research lie in its potential to inform evidence-based policies and practices that foster diversity and inclusion within the South African built environment. By proposing solutions and policy changes, this study seeks to address the root causes of structural barriers, opening pathways for individuals from underrepresented backgrounds to enter, progress, and excel within their professions. The reflection of these advantages is crucial in positioning this study within the broader conversation on diversity, inclusion, and professionalization in South Africa. The findings of this research may have implications not only for academic discourse but also for shaping policy decisions and influencing the practices of stakeholders within the built environment sector. This study, therefore, serves as a catalyst for change, offering insights that extend beyond theoretical considerations to impact the lived experiences of individuals within the profession. The questions considered for this study were as follows: RQ1. What are the thematic areas and clusters in demographics-based impediments to professionalism in the built environment? RQ2. What are the collaborative trends in advancing our understanding of the issues in demographics-based impediments to professionalism in the built environment? RQ3. How are professionals distributed demographically? RQ4. What are the challenges and solutions to eliminating demographics-based impediments to professionalism in the built environment? This study is structured as follows: Section 1 gives a vivid background to provide context in introducing the topic and declaring its importance. Section 2 gives an overview of the methodology adopted in answering the research questions of this study; the results are presented in Section 3 and strengthened with a discussion in Section 4. The subsequent subsections in Section 5, give a conclusion of this study, summary of the key contribution to knowledge, limitations, and recommendations.

2. Materials and Methods

The authors employed a multi-faceted approach, integrating three distinct methods, to comprehensively address the key questions raised in this study. The transparency and rigor of the chosen methods contribute to the robustness of the research findings.

2.1. Bibliometric Analysis

The first method involved a bibliometric analysis, aiming to trace the evolution of research on demographics-based impediments to professionalism. This approach allowed the researchers to identify thematic areas, clusters, and collaborative efforts within the topic. Bibliometric analysis is a valuable tool for understanding the landscape of scholarly work, offering insights into the growth, trends, and influential contributors in a particular field. By utilizing this method, the authors gained a holistic perspective on the existing literature related to demographics-based impediments in the built environment.

2.2. Document Analysis of Professional Registration

This study delved into the specifics of professionals' registration within the quantity surveying profession in South Africa, using it as a case study to illustrate identified issues. By focusing on a specific professional sector, the document analysis provided a nuanced view of real-world challenges faced by practitioners. This case study approach enriched the research by grounding it in practical examples, making the findings more applicable and relatable to professionals and policymakers in the field.

2.3. Systematic Review of Documents

A systematic review was conducted to connect the issues identified in the bibliometric analysis with previous findings, offering practical insights and potential solutions. Systematic reviews are essential for synthesizing existing knowledge and drawing meaningful conclusions. By following the PRISMA guidelines, the authors ensured a rigorous and replicable process for selecting and reviewing relevant literature. This method allowed them to identify global trends, critical discussion areas, and gaps in the current body of knowledge.

The bibliometric and systematic review formed a mixed review of scientific articles and a document analysis of professionals' registration in South Africa, which was carried out to answer the questions posed by this study. The mixed review offered a global perspective on trends and critical discussion areas of topical research. The guidelines of PRISMA were followed to retrieve articles from the Scopus database, as performed in extant studies [9,10]. The Scopus database is widely recognized for its extensive coverage. It is commonly regarded as the premier academic database for conducting literature reviews, primarily due to the high quality of papers it encompasses [11,12]. For this review, the keywords used include Demographics, Impediments, professionals, and built environment. Using exclusion criteria in systematic and scientometric reviews is a customary technique to enhance the probability of generating dependable and replicable outcomes while minimizing the inclusion of irrelevant studies. This methodology has been widely embraced in prior research endeavours [13,14]. The scope of the materials was restricted to scholarly articles published in the English language, specific to South Africa, in the Engineering subject area and with keywords relating to the construction industry and construction sector. The review considered journal articles and conference papers related to the built environment of the last ten years and focused on the identified objectives. In addition, the snowball sampling of articles was performed manually based on references to identify other relevant articles [15,16]. Snowball sampling was employed to identify additional relevant articles beyond those initially retrieved through the systematic review process. It involves using references from initially retrieved articles to find additional relevant literature. In a field like the built environment, where information might be dispersed across various sources and not fully captured by traditional databases, snowball sampling helps identify articles that might have been missed in the initial search.

The retrieved articles were analysed systematically and with the use of bibliometric analysis. This was considered to answer the questions posed by this study. The document analysis of professional registration in the quantity surveying profession in South Africa was also analysed. The professional body provided the document. This was adopted as a case study to illustrate the issues discussed in this study.

RQ1 was answered with the bibliometric review to unpack the thematic areas and clusters in demographics-based impediments to professionalism in the built environment; this was also utilized in answering RQ2 on collaborative trends in advancing our understanding of the issues in demographics-based impediments to professionalism in the built environment. Systematic review was also used in explaining challenges and solutions to eliminating demographics-based impediments to professionalism in the built environment (RQ4). The document analysis was utilized in explaining how professionals are distributed demographically (RQ3).

Figure 1 presents the workflow of the systematic review from which 33 documents were obtained, and the reference information was extracted to complete this article. The document assessment checklist is shown in Table 1.

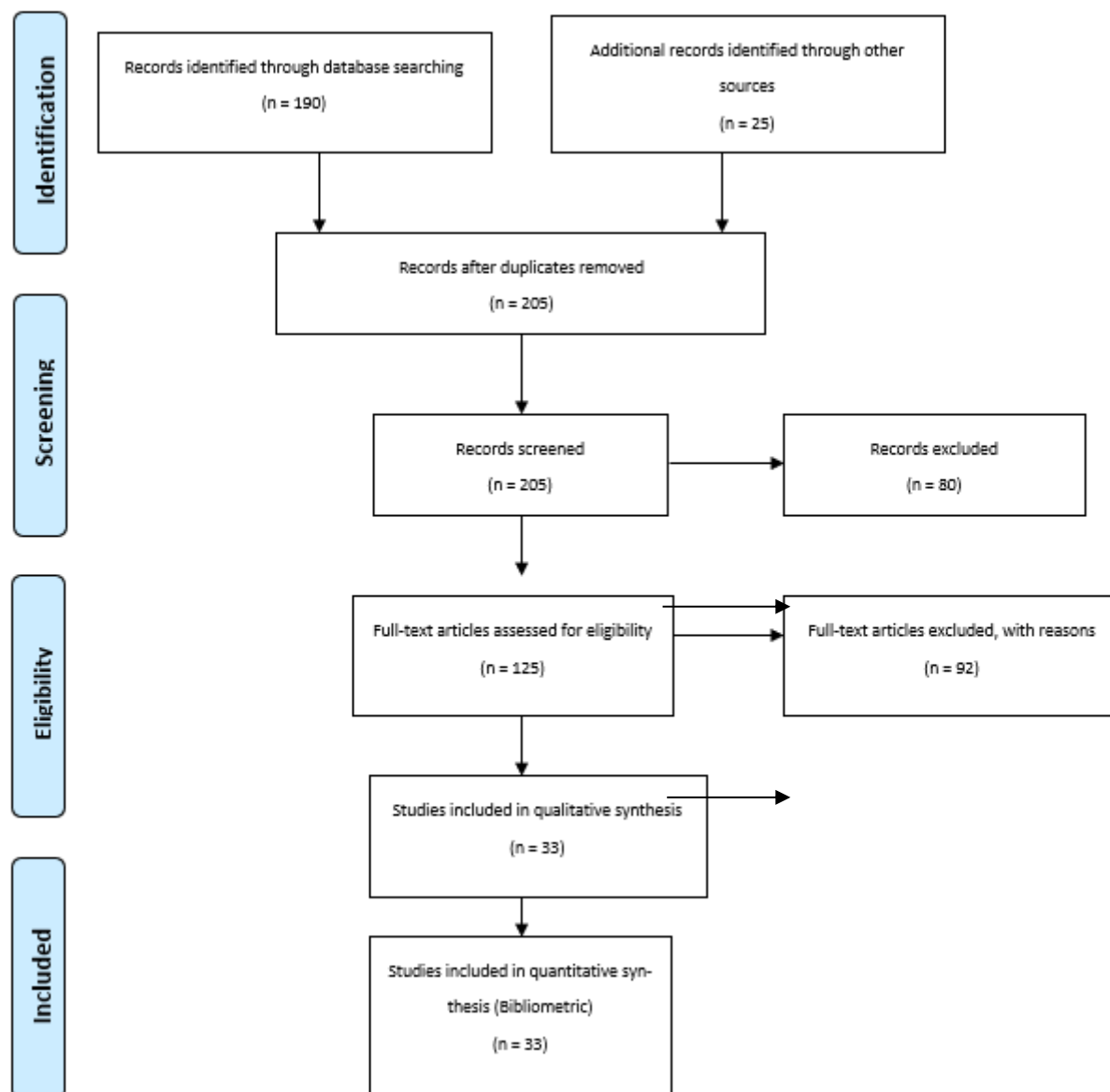


Figure 1. PRISMA flow diagram.

The scientometric analysis involved extracting metric data from the studied papers to examine the progression of themes within the topic area. In addition, the bibliometric analysis was conducted in order to generate document co-citation and co-occurring keywords [4,17,18]. The co-occurring keyword network refers to the interconnectedness of keywords in texts, indicating the underlying themes in research publications. This analysis unveiled the correlation among the emerging research themes across the years. The document co-citation network refers to the network of cited references found within the documents studied. This network provides insights into the common study themes and often-cited related works in existing studies [19].

Table 1. Document quality assessment checklist.

N	Quality Assessment Questions	Answer
QA1	Does the paper describe the interplay between professionalization and quality of project delivery?	(+1) Yes/(+0) No
QA2	Does the study specify how demographics influence professional capacity and development?	(+1) Yes/(+0) No
QA3	Does the paper describe the issues and dynamics underlying professionalization?	(+1) Yes/(+0) No
QA4	Are the limitations of demographics-based impediments to professionalization described in the paper?	(+1) Yes/(+0) No
QA5	Is the journal or conference in which the paper was published indexed in SCImago Journal Rank (SJR)?	(+1) if it is ranked Q1, (+0.75) if it is ranked Q2, (+0.50) if it is ranked Q3, (+0.25) if it is ranked Q4, (+0.0) if it is not ranked.

3. Results

Three approaches were adopted in answering the key questions posed by the study. First, a bibliometric analysis of the evolution of research on demographics-based impediments to professionalism was performed in order to uncover the thematic areas and clusters. Also, an author citation map to outline the key collaborative efforts in the topic area was created. A presentation of the document analysis followed these results on professionals' registration amongst quantity surveyors in South Africa. This was used as a case to illustrate the issues identified. A systematic review of the documents used for the bibliometric review was then conducted to connect the issues identified with previous findings and suggest practical insights and solutions.

3.1. Evolution of Research on Demographics-Based Impediments to Professionalism

3.1.1. Thematic Areas and Clusters

To examine the state of the art of studies in this area, the co-occurrence of keywords was examined based on all the keywords [20–22]. Using VOSViewer 1.6.20, a co-occurrence network map was generated to highlight the prolific extant areas examined, future areas proposed, and the extent of work covered. This gave insight into the key themes to examine in the document analysis of the study [23]. The various colours represent the clusters of closely related terms or those that frequently appear together. For instance, terms related to racial and ethnic categories like “race difference”, “ethnicity”, “ethnic group”, and “minority group” are clustered together in green. Its appearance confirms the theme is a critical research examination area. Central terms like “human”, “male”, “female”, and “demographics” indicate that these terms are pivotal in the dataset and have strong connections to various other terms [24]. Their positioning suggests they are foundational concepts for this dataset. The blue cluster encompasses terms related to psychological well-being and mental states like “depression”, “burnout”, and “suicidal ideation.” Terms here like “discrimination”, “racism”, and “workplace” suggest themes of social dynamics and discrimination. Moreover, methodologies and survey tools, as evidenced by terms like “questionnaire” and “surveys and questionnaires” were also indicated. The lines connecting the terms indicate relationships or co-occurrences [25]. The thicker a line, the stronger the relationship, meaning those terms often appear together. The networks are visualized and presented in Figure 2 below.

Given the prominence of terms like “race”, “gender”, “discrimination”, “depression”, and “workplace”, as seen in Table 2, the underlying dataset or research might be exploring the relationships between demographics, psychological well-being, and social issues [26–28].

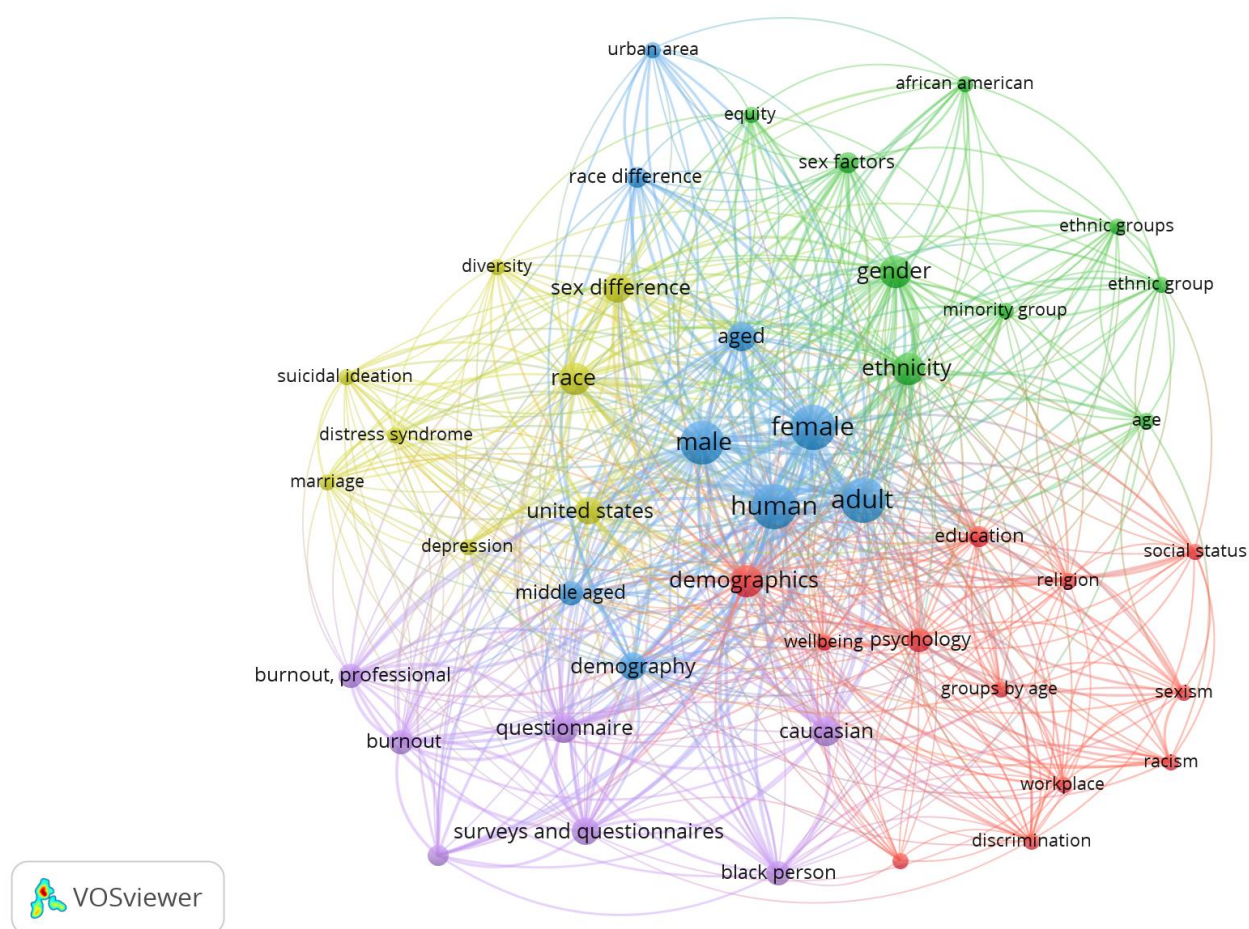


Figure 2. Network map of key thematic areas.

Table 2. Thematic focus and emerging areas.

Examined Demographic Areas	Consequences of This Phenomenon Examined	Potential Future Research Focus
Race	depression	Relationship between race issues and workplace depression
Equity	burnout	Relationship between equity issues and workplace burnout/performance
Sex	suicidal ideation	Relationship between sex/gender issues and well-being
Ethnic Group/Ethnicity	workplace discrimination	Relationship between ethnicity and workplace discrimination

3.1.2. Author Citation Network Map

The collaborative patterns or co-authorship networks generated using VOSViewer reveal the depth of ideation between authors in furthering this area of research. This reveals critical insight into the level of urgency and importance assigned to this issue in the built environment [10,29]. Each node (circle) represents an author or group of authors. The size of the node might indicate the prominence or frequency with which these authors appear in the dataset (e.g., the number of publications or collaborations they have) [30]. The links or lines connecting different authors suggest co-authorship or collaboration

between them. If two authors are connected, it likely means they have co-authored a paper or multiple papers together.

The different colours can indicate clusters or groups of authors who frequently collaborate. Each colour grouping represents a collaborative community within the dataset: For instance, the green-coloured authors might be a group that frequently collaborates on similar topics or within a particular domain. The same applies to orange, blue, and purple clusters [31–33]. The spatial proximity between nodes can suggest the strength of collaboration. Authors placed closer together might have stronger collaborative ties compared to those further apart. This group centred around “cals i.”, “wright s.”, “jasri.”, “dowey l.”, and others indicate a dense collaboration pattern, with many authors frequently working together (red cluster). Anchored by “dodge p.” and “drybye l.n.”, this cluster represents another collaborative community (blue cluster). “dade l.” and “day l.” seem to be the focal points of this cluster, possibly indicating their prominent role in this community (green cluster). “alk e.a.” and “wang x.” represents a less dense collaboration pattern, perhaps indicating a more specialized or distinct research area compared to the others (orange cluster). Authors such as “Schmidt s.w.” are relatively isolated from the central clusters, suggesting they have fewer collaborations within this specific dataset. Their positioning on the outskirts might indicate peripheral collaboration with the main clusters. This is shown in Figure 3 below.

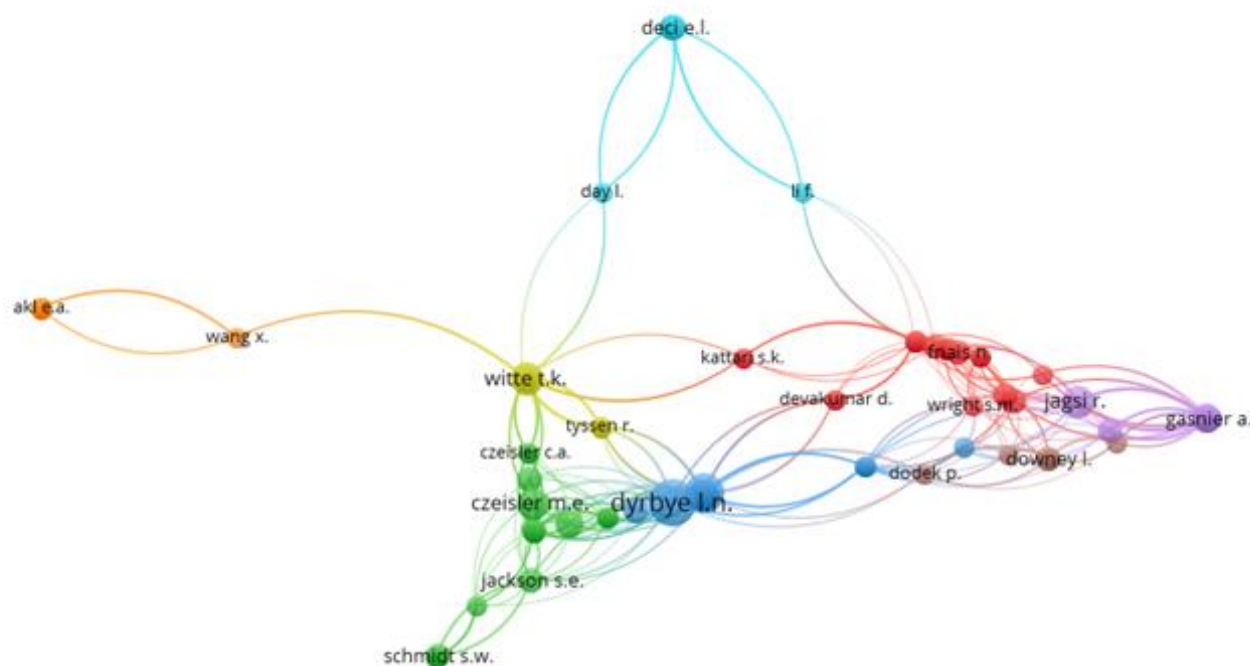


Figure 3. Author citation network map.

3.2. Distribution of Professionally Registered Quantity Surveyors (PrQs) in South Africa Based on Race

A document analysis of professional registration in the quantity surveying profession in South Africa was performed using statistical methods. The result shows that the highest proportion of PrQs identifies as White, accounting for just over 50% of the total. This is significant, especially when considering the broader demographic distribution of South Africa. The second largest group is the African demographic, though its representation is

notably less than half of the White group. Both the Indian and people-of-colour demographics have considerably lower representations, with the Indian group slightly ahead of the people-of-colour group. The dominance of White PrQs might be rooted in historical privileges associated with apartheid, where educational and professional opportunities were skewed in favour of the White population [6,34]. The relatively lower representation of African, Indian, and professionals of colour could suggest the existence of barriers—either educational, socioeconomic, or systemic within the profession. Given South Africa’s emphasis on transformation and diversity in the post-apartheid era, this chart might raise questions about the effectiveness of diversity initiatives within the quantity surveying profession [35–37]. This is shown in Figure 4.

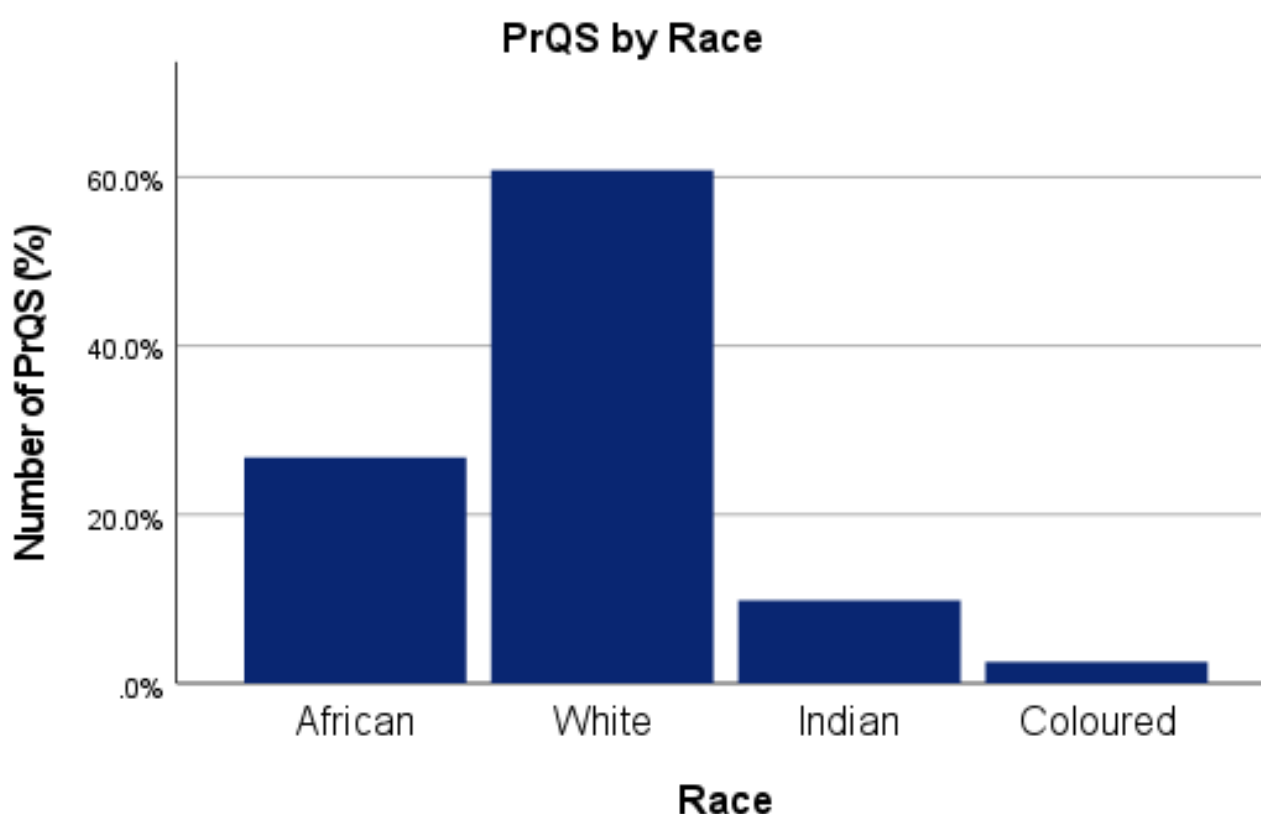


Figure 4. Distribution by race.

3.3. Crosstabulation (or Crosstab) of the Age Group Distribution against the Racial Backgrounds of Professionally Registered Quantity Surveyors (PrQs) in South Africa

There is a notably high percentage of White professionals in the 65+ age category (19.9%). This suggests that a significant portion of the older generation of PrQs in South Africa is White (Table 3).

Table 3. Age group and race Crosstabulation.

Age Group * Race Crosstabulation						
		Race				Total
		African	White	Indian	People of Colour	
Age Group	20–25	Count	1	0	1	2
		% within Race	0.1%	0.0%	0.4%	0.1%
	26–29	Count	32	66	8	108
		% within Race	4.8%	4.3%	3.2%	4.3%

30–34	Count	129	253	74	20	476
	% within Race	19.2%	16.6%	30.0%	31.3%	19.0%
35–39	Count	161	223	49	8	441
	% within Race	24.0%	14.6%	19.8%	12.5%	17.6%
40–44	Count	140	146	27	12	325
	% within Race	20.9%	9.6%	10.9%	18.8%	13.0%
45–49	Count	94	126	28	8	256
	% within Race	14.0%	8.3%	11.3%	12.5%	10.2%
50–54	Count	40	146	30	5	221
	% within Race	6.0%	9.6%	12.1%	7.8%	8.8%
55–59	Count	33	139	12	5	189
	% within Race	4.9%	9.1%	4.9%	7.8%	7.5%
60–64	Count	22	123	8	1	154
	% within Race	3.3%	8.1%	3.2%	1.6%	6.1%
65+	Count	19	303	10	3	335
	% within Race	2.8%	19.9%	4.0%	4.7%	13.4%
Total	Count	671	1525	247	64	2507
	% within Race	100.0%	100.0%	100.0%	100.0%	100.0%

The African professionals appear to be younger on average, with their highest representation in the 35–39 age category (24.0%). This might indicate a more recent influx of young African professionals into the profession. The largest proportion of Indian PrQs falls in the 30–34 age category (30.0%). This suggests that many Indian professionals are currently in their prime working years. The people-of-colour demographic displays relatively balanced representation across the 30–34, 40–44, and 45–49 age groups, comprising 31.3%, 18.8%, and 12.5%, of each, respectively.

The 30–34 age group has the highest overall representation across all the races (19.0% of the total). The least represented age group across all the races is the 20–25 category, indicating that few professionals register at such an early age. The 65+ age group is notably significant, especially for the White professionals, which can reflect either long-term career commitment or possible delays in retirement [5,38].

3.4. Distribution of Professionally Registered Quantity Surveyors (PrQs) in South Africa Based on Race and Gender

The chart shown in Figure 5 represents the distribution of professionally registered quantity surveyors in South Africa, which suggests a measure of those in the profession who have reached a certain level of recognition or qualification. South Africa has a unique racial and socio-political history, which may have implications for professional representation across different racial groups. The significantly high number of White male registered quantity surveyors suggests they are the most represented demographic in the profession. This could be attributed to various reasons, including historical advantages in education and professional opportunities.

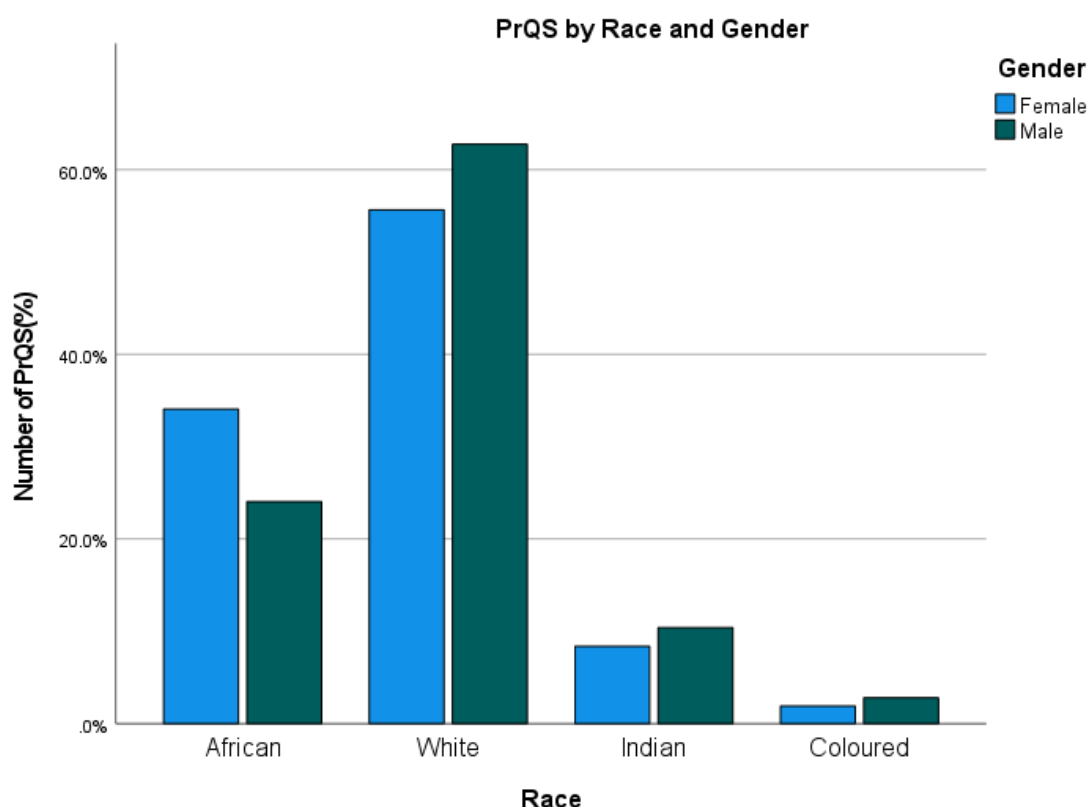


Figure 5. Distribution of professionally registered quantity surveyors (PrQs) in South Africa based on race and gender.

The “People of Colour” category appears to be the least represented. Understanding the reasons behind this underrepresentation would require further investigation. This alludes to underrepresentation. In terms of gender disparity, across all the racial categories, there is a higher representation of men compared to women.

3.5. Distribution of Professionally Registered Quantity Surveyors (PrQs) in South Africa Based on Race and Age Group

This section, as shown in Figure 6, illustrates “PrQs by Race and Age Group” for professionally registered quantity surveyors in South Africa. It presents a breakdown of these professionals by race and then further subdivides each racial group by age. The age groups are divided into eight categories, ranging from “20–25” to “65+”. Most of the professionally registered quantity surveyors across all the racial groups are within the “30–34” to “50–54” age brackets. The younger professionals (“20–25” and “26–29”) are less represented across all the racial categories, which might be expected given the time it takes to complete education and gain professional recognition. The “65+” age group, representing senior professionals, is also smaller in representation.

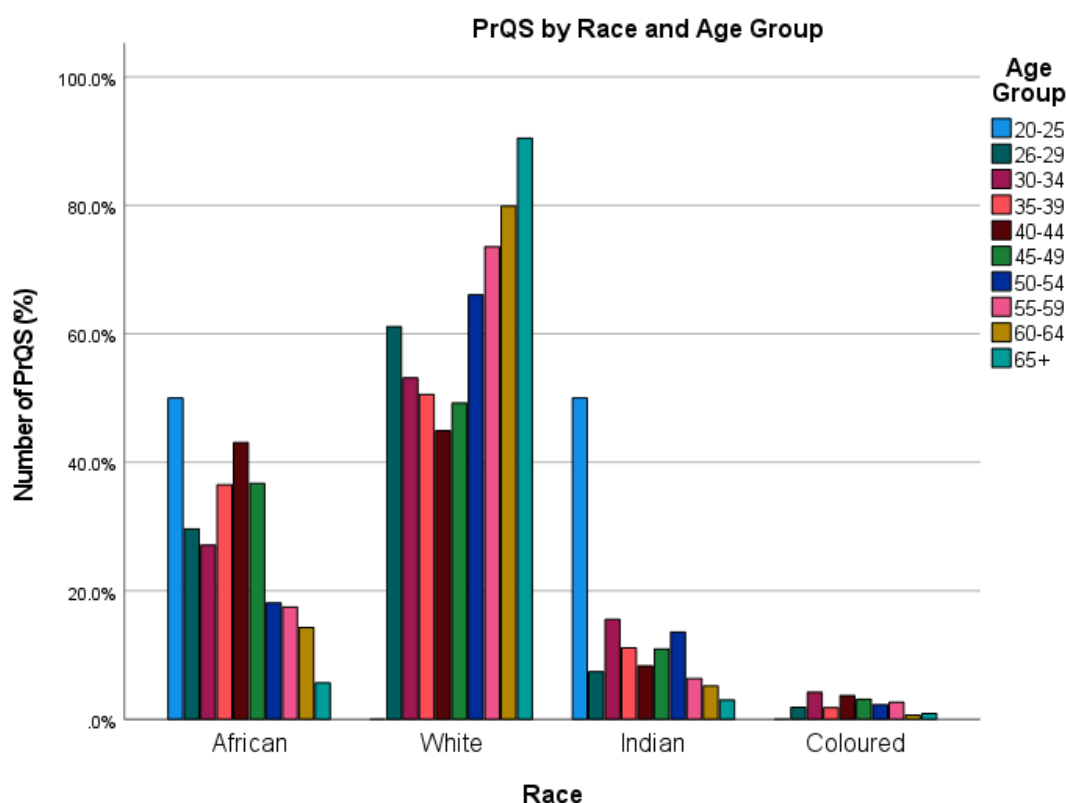


Figure 6. Distribution of professionally registered quantity surveyors (PrQs) in South Africa based on Race and Age Group.

The racial breakdown revealed that a substantial representation in the “30–34” and “35–39” age groups, with a decline in the older age groups, are African. For the White individuals, There is a notable peak in the “45–49” age group. The representation remains relatively high from “30–34” to “55–59” but sees a decline in the younger and older age brackets. With regard to the Indian individuals, the largest representation is in the “35–39” age group, with a significant drop for both younger and older professionals. For the people of colour, The representation is relatively low across all the age groups, with slight peaks in “30–34” and “40–44”.

3.6. Distribution of Professionally Registered Quantity Surveyors (PrQs) in South Africa Based on Gender and Age Group

The overall gender distribution reveals that there is a pronounced difference in the number of registered male PrQs compared to female PrQs across all the age groups. This shows that the profession has a higher male dominance. With the young professionals, there is a significant representation in the “20–25” age group, which then sees a notable decline in the “26–29” age bracket amongst the female groups. Meanwhile, in the male group, The representation starts relatively lower in the “20–25” age group compared to the females but then sees a continuous increase, peaking at “40–44”. This is shown in Figure 7.

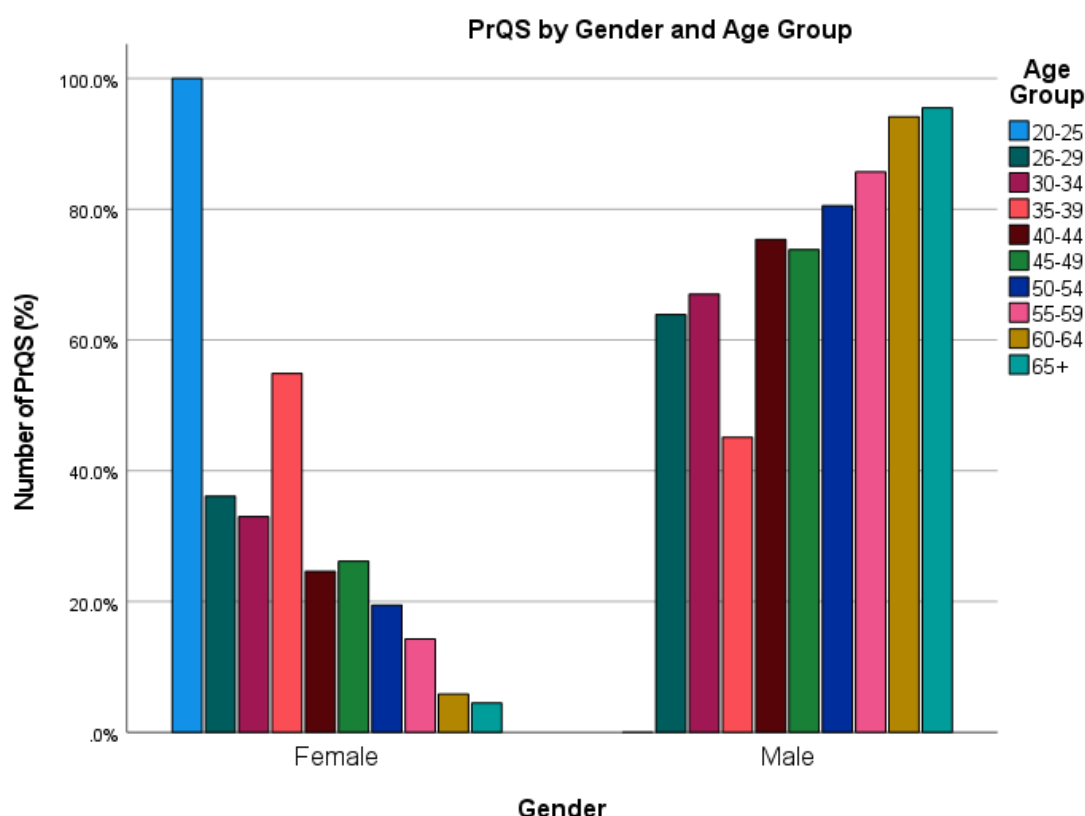


Figure 7. Distribution of professionally registered quantity surveyors (PrQs) in South Africa based on gender and age group.

In terms of the female mid-career professionals, there is a gradual increase from the “26–29” age group, peaking at “35–39”. After this peak, there is a consistent decline. Compared to their male counterparts, the representation is highest from “30–34” to “50–54”, with a particularly pronounced peak at “40–44”. For the senior professionals, the representation diminishes considerably from the “55–59” age group onward for females. In the male group, there is a decrease post the “50–54” age group, but the representation remains relatively higher than females, even in the “65+” bracket.

4. Discussion

4.1. Demographics - Based Impediments to Professionalism in the South African Built Environment

In exploring the relationship between race, gender, and their social impact, Erica [27] indicates that when professionals perceive unequal disparities in membership spread in professional bodies, the perceptions undermine their confidence in the effectiveness of regulating and professional bodies. This ripples out to affect how other engagements, activities and capacity development programs are perceived. Also, this leads to the cause of maladaptation. Cognitive, emotional, and attitudinal states are compounded by the projection of negative behaviours exhibited towards work and peers [39]. It becomes essential to study this as it demonstrates how past policies and socioeconomic factors continue to influence professional opportunities and representation. Are there equal opportunities for all racial groups to receive the education and training required to become a quantity surveyor? While the answer is yes, the study in support of the previous shows that their attainment of professionalization is relatively poor [40]. The breakdown by age and race reveals that high representation in the middle age groups, particularly among White and African professionals, may suggest that a significant portion of the current professionals

will approach retirement in the next two decades. This could mean a potential generational transition in the profession. It is unclear how this generation will transfer knowledge to upcoming ones without being in the professional spectrum. This has critical implications for the future of the profession.

The relatively lower representation in the younger age groups might be an area of focus. It is crucial to determine if this indicates a declining interest in the profession or if it is a natural pattern given the time required for education and professional establishment. While racial diversity in the profession is essential, age diversity ensures a mix of fresh perspectives with experienced insights. The current chart indicates some age groups might be underrepresented in specific racial categories. The presence of senior professionals (e.g., “55–59” and “60–64”) across racial groups indicates an opportunity for mentorship programs, helping younger professionals navigate the field. The distribution, especially the prominence, of the White professionals in the “45–49” age bracket, might reflect the historical advantages that this group had in education and professional opportunities during their early career stages in South Africa [34,40].

When the PrQS gender disparity was analysed, it revealed that there is a significant drop for females after the “20–25” age group, which might indicate challenges faced by young female professionals in the industry, potentially leading to career changes or interruptions. Men appear to sustain their presence in the profession from their early to late career, whereas women seem to experience a drop, especially post-mid-career. While several programs are currently available to encourage females to participate in professional training and development programs, this study reveals that much has not been achieved from such approaches [5,40]. The pronounced decline for females after the “35–39” age bracket suggests potential barriers that may exist. These could range from work–life balance challenges, professional development opportunities, or workplace dynamics that might not be as accommodating or conducive. The higher representation of senior male professionals indicates potential for mentorship programs. However, given the gender disparity, there might be a need to ensure that mentorship programs are inclusive and address the unique challenges faced by female professionals [41]. When viewed in the broader socio-cultural context of South Africa, this study’s findings raise questions about gender dynamics in the profession. It leads to discussions about the need for initiatives or policies to achieve gender parity.

4.2. Interplay of Age, Professionalization, and Skills Transfer

As also shown in Appendix A, the breakdown by age and race highlights a concentration of professionals, particularly among White and African individuals, in the middle age groups. This demographic distribution implies an imminent generational transition within the profession, posing challenges in knowledge transfer to upcoming generations. Addressing this issue is pivotal for the profession’s future, necessitating a focus on the relatively lower representation in younger age groups [35]. The causative factors warrant careful examination, whether a decline in interest or a natural progression given the time required for education and professional establishment. While racial diversity is crucial, the study underscores the importance of age diversity to ensure a blend of fresh perspectives with experienced insights. The observed underrepresentation of certain age groups in specific racial categories suggests an opportunity for mentorship programs, particularly among senior professionals in the “55–59” and “60–64” age brackets. The prominence of White professionals in the “45–49” age bracket raises questions about historical advantages during their early career stages, emphasizing the need for equitable opportunities throughout one’s professional journey [42]. Shifting the focus to gender dynamics, the analysis reveals a significant drop for females after the “20–25” age group, indicating challenges young female professionals face. While various programs aim to encourage female participation in training and development, the study suggests that more needs to be done to address the pronounced decline after the “35–39” age bracket. Barriers such as work–

life balance challenges, limited professional development opportunities, and workplace dynamics need targeted attention.

The gap in representation suggests a potential need for more outreach and educational programs aimed at racial groups that are underrepresented in the profession. This could ensure that more individuals from diverse backgrounds consider and pursue quantity surveying as a career. The result could also lead to discussions about workplace dynamics and whether they are inclusive and accommodating for professionals from all racial backgrounds. In the broader socio-cultural context of South Africa, the findings raise questions not only about gender dynamics but also about racial dynamics within the profession. Initiatives or policies aimed at achieving gender parity take on added significance, necessitating a comprehensive approach to address the interconnected challenges. The observed gap in representation among racial groups signals a need for outreach and educational programs to ensure diversity in the quantity surveying profession. This involves attracting individuals from underrepresented racial backgrounds and necessitates discussions about inclusive workplace dynamics accommodating professionals from all racial backgrounds. The concentration of professionals, particularly among specific racial groups in the middle age, raises concerns about transferring skills to the upcoming generation. As a substantial portion of the current workforce approaches retirement, the potential generational transition within the profession becomes critical. The lack of representation in younger age groups suggests a risk of skills and knowledge gaps [43–45].

The gender and racial disparities identified in this study have implications for social equity within the profession. The historical advantages that certain racial groups, particularly White professionals, may have experienced during their early career stages highlight the need for a more equitable distribution of opportunities throughout one's professional journey [46]. Achieving social equity requires dismantling barriers to entry and progression, ensuring that individuals from all racial backgrounds have equal access to education, training, and career advancement opportunities. The pronounced decline in female representation after the "20–25" age group raises concerns about inclusivity in the profession. The challenges young female professionals face, potentially leading to career changes or interruptions, highlight the need to address workplace dynamics that may not be accommodating or conducive [34,36]. Inclusivity involves creating an environment that supports diverse perspectives, experiences, and career trajectories. Mentorship programs tailored to the unique challenges faced by female professionals are crucial for fostering inclusivity and ensuring that gender disparities do not impede career progression.

4.3. Influence of Demographics-Based Impediments to Professionalization on Project Delivery and Quality of Infrastructure

The issues of race and gender dynamics in the quantity surveying profession in the South African built environment can significantly impact project delivery and the quality of infrastructure in several ways:

4.3.1. Skills Gap and Project Complexity

The concept of skill scarcity can be characterized as a lack of proficiency in particular fields and occupations, as determined by one's qualifications and professional background. The Department of Labour in South Africa considers a qualification or job to be one that is only attainable or suitable for a limited number or minority of individuals who possess the necessary skills or meet the appropriate qualifications [47]. Several professional associations have emphasized the necessity for a comprehensive and well-rounded type of construction sector professional capable of addressing a wide range of societal concerns that may arise in the future [48,49]. These organizations have also expressed a desire for enhancements to the educational framework in order to meet this demand [50]. The potential skills gap resulting from underrepresentation in younger age groups may lead to a lack of expertise in handling complex projects. Quantity surveyors play a crucial role in project cost management, and a deficiency in skills can impact accurate project

estimations, budgeting, and overall financial management. Programmes that receive support from the community and employers, aiming to maximise professional development, can enhance adherence. However, these goals cannot be achieved without adequate efforts to ensure members achieve professionalization. This is more essential given the high number of graduates who do not continue the professional ladder with the decision to leave an intended field of study.

4.3.2. Knowledge Transfer Challenges

The concentration of professionals in the middle age groups, particularly among specific racial categories, may hinder the effective transfer of knowledge to the next generation. This knowledge gap can affect the efficient execution of projects, as experience and insights gained from past projects contribute to effective decision-making and problem-solving. In the specific context of South Africa, the government implemented an effort called the Joint Effort on Priority Skills Acquisition (JIPSA) in 2006 [51]. This process enabled the recognition of deficiencies in skills, particularly the scarcity of proficient professionals, managers, and craftspeople in the workforce. The task at hand is further compounded by the disparities in educational opportunities and the enduring consequences of the apartheid era. This effort aims to enhance the availability of essential skills within the workforce.

4.3.3. Diversity of Perspectives

Diversity is commonly conceptualized based on its primary dimensions: age, ethnicity and culture, gender, race, religion, sexual orientation, and ability [52]. The topic of diversity holds significant importance in relation to the globalized nature of institutions and corporate entities and their competitiveness. The construction business, along with various other sectors, has historically exhibited a lack of diversity, thereby discouraging women, black individuals, and individuals with disabilities from pursuing careers in these fields [37,53]. The result is a distinctively exclusive culture that contrasts greatly with a diversified culture characterized by inclusivity, appreciation, and recognition of individuals' worth, enabling them to reach their full potential. It is generally recognized that the South African construction industry is very large, diverse, and complex [54,55]. Its size and complexity are further complicated by the vast number and range of employees found in the sector and the significant differences in the size and nature of its member organizations. The underrepresentation of certain age groups and racial categories may limit the diversity of perspectives in project teams [8,26]. Diverse teams are known to bring a broader range of ideas and innovative solutions, enhancing the overall quality and creativity of project delivery [7,8].

The presence of diverse viewpoints serves as a reminder that it is crucial to engage with a broad range of perspectives in order to establish a constructed environment that is more equitable and just, and that fosters trust from all segments of society [27,56]. Several studies have revealed a correlation between different types of diversity and enhanced organisational performance, strategic decision-making, and innovation. Heterogeneous teams have been found to foster creativity, innovation, and problem-solving abilities, hence leading to enhanced decision-making processes characterised by a higher level of information integration [57]. The promotion of enhanced problem-solving is facilitated by a varied team's utilisation of numerous perspectives while confronting a given problem. The results of their study also suggest that addressing complexity requires a diverse range of approaches, and a multitude of abilities can effectively resolve a wide array of intricate issues.

4.3.4. Equitable Resource Allocation

Unequal opportunities for education and professional development based on race and gender can result in the uneven distribution of skills and resources within the profession [58,59]. This imbalance may impact how resources are allocated to different projects, potentially leading to disparities in project outcomes. As stated by Hennein et al. [4], these experiences could lead to belittlement, unequal opportunities for career advancement, gendered workload distributions, expectations for communication, and objectification [60,61]. Also, previous studies have outlined that gender discrimination may be more severe with younger professionals of colour. The construction sector has a workforce of around 1,222,000 individuals, with males comprising 87% and females comprising 13% of the total employees [34]. When compared to other industries, the construction business exhibits the highest percentage of male workforce participation. The construction business exhibits a very high level of male representation, with a proportion of 87%, which surpasses the industry-wide average of 56% observed across all sectors [34,52]. This phenomenon exemplifies the significance of intersectionality in comprehending the instances of discrimination faced by women. The concept of intersectionality encompasses the examination of how several social identities, including, but not limited to, gender, race, ethnicity, occupation, and age, overlap and interplay to shape individuals' encounters with discriminatory practices [40]. This is essential to avoid professional isolation, stunted professional growth, and unequal remuneration.

4.3.5. Workplace Dynamics and Project Efficiency

The construction sector is characterized by a significant presence of conflict, with common sources of disputes in construction projects including variations in project specifications, extensions of project timelines, limited availability of information, and challenges related to project administration and management [43]. Issues related to workplace dynamics, including those affecting female professionals, such as work–life balance challenges and limited professional development opportunities, can influence the efficiency of project teams. They can also affect how project professionals handle and react to disputes. A supportive and inclusive work environment fosters collaboration and ensures that all team members can contribute their best to project delivery [50]. South Africa is currently confronted with a dearth of built environment experts, impeding its ability to meet its infrastructure delivery service demands adequately [62]. However, project efficiency is also affected when recruiting professionals is difficult. As stated by Madikizela [31], The construction business is commonly regarded as a sector with low status and little technological advancement, characterized by challenging and rigid working conditions. Additionally, it is known for maintaining a pervasive culture that is often associated with masculinity and is predominantly dominated by White males. Recruitment to the construction sector is badly affected by the poor image associated with its affiliation with stereotyped male ideals and building site mythology. The endeavours made by the South African government in the post-apartheid era to bring about changes in the racial and socioeconomic composition of the construction industry have been unsuccessful, with the actual attainment of the targeted 25% black ownership standing at a mere 10% [34]. In 2013, a significant majority (80%) of public sector tenders were allocated to large contractors with grades 7 to 9 CIDB rating. This suggests that the primary beneficiaries within the sector continue to be White capital, even under the new government's tender system. Hence, following the era of apartheid, it can be observed that there has been a discernible pattern characterized by a growing consolidation and centralization of financial resources within the well-established construction firms that were predominantly White during the apartheid regime. An enhanced emphasis on diversity can yield several advantages for organizations, including those operating within the South African construction industry. These benefits encompass a heightened comprehension of local markets and customers,

an improved ability to attract and retain top talent, increased creativity, enhanced problem-solving capabilities, and improved organizational flexibility.

4.3.6. Client Relations and Reputation

A lack of diversity and inclusivity within the profession may affect client relations, especially in a society that values representation and diversity. Clients may seek project teams that reflect a range of backgrounds and perspectives, and a profession lacking in diversity might face challenges in winning and retaining clients. As observed by Madikizela [52], female graduates in the field of construction tend to predominantly occupy secretarial or administrative positions, whilst their male counterparts are more likely to pursue professional or technical roles. Furthermore, it is observed that male graduates in the construction business tend to receive greater salaries and are more frequently engaged in permanent employment compared to their female counterparts [50].

4.3.7. Inclusive Infrastructure Design

Research conducted in the Southern African region provides evidence of the mechanisms via which the concepts of “inclusion” and “exclusion” manifest in situations where the racial majority is subjected to different forms of social exclusion [37]. Infrastructure projects should serve diverse communities, and a lack of diversity within the built profession may result in infrastructure that does not fully meet the needs of all demographic groups. Inclusive design, considering various perspectives, is essential for creating infrastructure that benefits the entire community [49,63]. The presence of diversity can foster discussions about task-related conflicts, ultimately leading to innovative approaches for resolving conflicts. Companies are seeing the necessity of hiring a workforce that mirrors the present demographics of a diverse society [7]. This is viewed as a significant competitive advantage for companies in terms of attracting and maintaining the most skilled human resources, considering the prevailing trends in workforce composition [64,65]. A staff that encompasses a range of backgrounds and perspectives is essential for promoting innovation, nurturing creativity, and establishing comprehensive business strategies. The presence of many perspectives fosters the generation of inventive concepts, novel services, and fresh products while promoting unconventional and creative thinking.

4.3.8. Ethical Considerations

The profession’s failure to address issues of inequity may raise ethical concerns. Ethical project management involves ensuring fairness, transparency, and the equitable treatment of all stakeholders. Issues related to diversity and inclusiveness are integral to ethical considerations in project delivery. Organizations have also recognized that the extent of their success and competitiveness will be contingent upon their ability to effectively integrate and manage the demographic workforce shifts [52]. Organizations are progressively turning to cross-functional work groups and project teams as a means to foster creativity, enhance problem-solving capabilities, and improve decision-making processes. Frequently, teams exhibit informational diversity, which is closely associated with variations in demographic features and strongly ingrained ideas and views. Scholars in the domain of diversity have employed the theoretical concept of cognitive resource diversity to assert that the distinctive cognitive resources that individuals from varied backgrounds contribute to a team positively impact its overall performance [34,66].

4.4. Managing Demographics-Based Impediments to Professionalization and Diversity

From an economic standpoint, workplace diversity substantially influences profitability, revenue, and productivity [67]. The notion of diversity introduces a multifaceted viewpoint encompassing various ethnic, racial, and cultural backgrounds inside organizations, hence fostering an understanding of heterogeneous populations in both work environments and commercial sectors [68]. Organizations employ a cost–benefit analysis to ascertain

diversity's impact [69]. Due to their conviction in the advantages that diversity offers to businesses, they hold this belief. The notion of the commercial case for diversity was cultivated during the 1980s. The recognition that diversity in the business context can yield advantages was a notable advancement, as it challenged the notion that women and historically marginalized individuals should be excluded from the workforce. This recognition stems from the understanding that their diverse perspectives and backgrounds can contribute to positive business outcomes, including enhanced profitability and productivity.

Diversity management involves the development and execution of extensive organizational and managerial procedures that establish a corporate culture conducive to the open expression, respect, and utilization of diverse thoughts and perspectives. This is performed with the aim of benefiting the business, employees, and the community. Contemporary work environments encompass a diverse array of cultures, genders, age groups, and ethnic backgrounds. The presence of a diverse work environment offers businesses the chance to develop and implement organizational methods that prioritize and effectively handle diversity while simultaneously reducing obstacles and biases. Managing diversity is a deliberate and calculated endeavour that enables businesses to capitalize on diversity's economic, creative, and innovative benefits. This entails a dedication to human resource management systems, including recruitment rules, reward programmes, performance reviews, employee development, and individual managerial practices, in order to attain a competitive edge through leadership and teamwork. The importance of diversity management has increased significantly due to societal changes, demographic shifts, and the globalization of the labour market [70]. Furthermore, to thrive in the present-day, fiercely competitive, and globalized business landscape, businesses must prioritize diversity management and effectively harness the advantageous potential inherent in varied teams. Diversity management is a widely employed method among businesses aiming to establish a conducive work environment that enables people to fully realize their capabilities while pursuing organizational goals. This form of management entails a continuous, systematic, and deliberate dedication by the business to attract and retain a diverse workforce with varied experiences and talents [71,72].

Diversity is an inherent social phenomenon that exhibits a strong correlation with the process of globalization. The presence of a diverse workforce has a positive impact on creativity and innovation among teams at the organizational level. Additionally, diversity also influences the overall workforce. The presence of diversity within an organization has the potential to contribute to a competitive advantage, therefore making diversity management an increasingly significant aspect of workforce management. Diversity management is a crucial aspect of strategic management that aids organizations in recognizing distinctions among employees, thereby cultivating a reservoir of knowledge, and consistently thriving by leveraging a synergistic impact. The significance of inclusivity is paramount for organizations seeking to foster innovation and provide tangible financial outcomes. Organizations are required to devise strategies for integrating the perspectives of individuals who represent the expanding diversity of consumers. The concept of inclusion encompasses not only the recruitment of a varied and skilled workforce, but also the active involvement and participation of these employees to enhance brand equity. The enhancement of creativity in the management of organizational challenges and opportunities has been demonstrated to be positively correlated with the involvement of a varied group that brings forth a wider range of information, skills, expertise, and views.

4.5. Contribution of Study

To highlight the contribution of this study concisely, this study employed bibliometric analysis to explore the evolution of research on demographics-based impediments to professionalism. A co-occurrence network map identified thematic areas, clusters, and key terms. For example, the terms related to race and ethnicity clustered together, highlighting critical research areas. Hennein et al. [4] indicated a similar finding in that race, ethnicity, and gender-based issues are prominent, with underrepresented groups such as

women and workers with less educational skills being more affected. The analysis illuminated foundational concepts, themes of social dynamics and discrimination, and the importance of social equity, as demonstrated in [7]. The authors emphasised that this is imperative for job satisfaction. The distribution of professionally registered quantity surveyors (PrQs) based on race showed a significant overrepresentation of White professionals, reflecting historical privileges associated with apartheid. This raised questions about the effectiveness of diversity initiatives, indicating potential barriers for African, Indian, and professionals of colour. Scoresby et al. [9] highlighted that not resolving these issues is the leading cause of work-related psychological distress. The age group representation analysis revealed concentration in the middle age groups, suggesting an imminent generational transition. The underrepresentation of younger professionals suggested potential risks of skills and knowledge gaps. This finding is further supported by Zhou et al. [13]. The distribution of PrQs based on race and gender highlighted gender disparities, particularly, a significant drop for females after the “20–25” age group. This raised concerns about challenges faced by young female professionals, indicating potential barriers related to work–life balance and professional development opportunities. The concentration of professionals in the middle age groups was linked to knowledge transfer challenges, affecting efficient project execution. This study acknowledged government efforts to address skill deficiencies but highlighted the enduring consequences of apartheid and disparities in educational opportunities. To resolve this, Jiang et al. [23] proposed combined efforts between government policymakers and industry efforts. The findings have significant implications for social equity, project delivery, and the overall quality of infrastructure in South Africa, emphasizing the importance of a holistic and strategic approach to address the identified challenges.

5. Conclusions, Limitations, Recommendations, and Future Directions

Numerous studies have been conducted to examine the profound influence of the construction industry’s arduous character on the professional trajectories of historically marginalized groups, including individuals who were previously underprivileged, women, black individuals, and those with impairments. This study examines how these interplay in the built environment, specifically in relation to professionalization. This study provides insights into the age and racial distribution of professionally registered quantity surveyors in South Africa. It points to potential future trends, challenges, and opportunities in the profession, especially when considered in the country’s unique socio-political context. Areas of further study could include explicit or implicit barriers that make it challenging for certain groups to achieve professional registration. Initiatives must be in place to encourage more women to become registered quantity surveyors.

The discussion on demographics-based impediments to professionalism in the South African built environment highlights critical issues related to race, gender, and age, and their impact on the quantity surveying profession. The findings underscore the need for a comprehensive approach to address these challenges and ensure a more equitable and inclusive professional landscape. The interplay of age, professionalization, and skills transfer reveals a concentration of professionals in the middle age groups, particularly among White and African individuals. This demographic distribution signals an imminent generational transition, emphasizing the importance of addressing the lower representation in younger age groups. Mentorship programs, especially among senior professionals, become crucial for knowledge transfer and the future of the profession. Furthermore, the underrepresentation of certain age groups in specific racial categories calls for targeted outreach and educational programs to ensure diversity in the quantity surveying profession.

This study also sheds light on gender disparities, particularly the significant drop for females after the “20–25” age group. This raises concerns about challenges young female professionals face and emphasizes the need for inclusive mentorship programs tailored to address their unique obstacles. The findings suggest that current efforts to encourage

female participation in training and development programs may not be fully effective, necessitating a deeper examination of barriers such as work–life balance challenges and limited professional development opportunities. The influence of demographic-based impediments on project delivery and infrastructure quality is multifaceted. The potential skills gap resulting from underrepresentation in younger age groups could impact on project cost management and financial planning. Knowledge transfer challenges among specific racial categories may hinder effective project execution, emphasizing the need for diverse perspectives in project teams. Unequal opportunities for education and professional development based on race and gender can lead to the uneven distribution of skills and resources, affecting resource allocation and potentially leading to disparities in project outcomes.

Moreover, the lack of diversity and inclusivity within the profession may impact client relations and reputation, as clients increasingly seek project teams that reflect diverse backgrounds and perspectives. Inclusive infrastructure design is crucial for meeting the needs of diverse communities, and a profession lacking diversity may fail to deliver infrastructure that fully serves all demographic groups. Ethical considerations come to the forefront, with the failure to address issues of inequity raising ethical concerns. Ethical project management involves ensuring fairness, transparency, and the equitable treatment of all stakeholders, and issues related to diversity and inclusivity are integral to ethical considerations in project delivery. Managing demographics-based impediments to professionalism and diversity requires a deliberate and calculated effort by the profession. Diversity management, involving the development and execution of organizational procedures conducive to diverse thoughts and perspectives, becomes essential. The significance of inclusivity cannot be overstated, as it fosters innovation, creativity, and a competitive advantage for organizations. The discussion emphasizes the need for a strategic and continuous commitment to diversity management, recognizing the workforce's changing demographics and globalized nature.

Future studies will benefit from an in-depth analysis of socio-economic status related to professionalization issues. Conducting longitudinal studies to track the generational transition highlighted in the research could provide valuable insights into how the profession evolves over time. Given the observed gender disparities, future research could focus on a detailed examination of challenges faced by female professionals throughout their careers. This may include investigating work–life balance issues, professional development opportunities, and workplace dynamics contributing to the pronounced decline in female representation after specific age brackets. Assessing the effectiveness of existing mentorship and capacity-building programs, particularly those aimed at knowledge transfer and supporting younger professionals, is crucial. Future research can explore the impact of mentorship on career progression, skills development, and the overall professional experience. Future research should explore policy implications and interventions to address demographics-based impediments. This involves proposing actionable recommendations for policymakers, professional bodies, and educational institutions to foster inclusivity, diversity, and equal opportunities.

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Appendix A

Table A1. Age and sex crosstabulation.

Age Group Sex Crosstabulation					
		Sex		Total	
		Female	Male		
Age Group	20–25	Count	2	0	2
		% within Sex	0.3%	0.0%	0.1%
	26–29	Count	39	69	108
		% within Sex	5.7%	3.8%	4.3%
	30–34	Count	157	319	476
		% within Sex	23.1%	17.5%	19.0%
	35–39	Count	242	199	441
		% within Sex	35.5%	10.9%	17.6%
	40–44	Count	80	245	325
		% within Sex	11.7%	13.4%	13.0%
	45–49	Count	67	189	256
		% within Sex	9.8%	10.4%	10.2%
	50–54	Count	43	178	221
		% within Sex	6.3%	9.7%	8.8%
	55–59	Count	27	162	189
		% within Sex	4.0%	8.9%	7.5%
	60–64	Count	9	145	154
		% within Sex	1.3%	7.9%	6.1%
	65+	Count	15	320	335
		% within Sex	2.2%	17.5%	13.4%
Total	Count	681	1826	2507	
	% within Sex	100.0%	100.0%	100.0%	

Table A2. Age group & race crosstabulation.

Age Group Race Crosstabulation							
		Race				Total	
		African	White	Indian	Coloured		
Age Group	20–25	Count	100	77	24	10	211
		% within Race	7.1%	15.2%	12.4%	9.2%	9.5%
	26–29	Count	338	141	44	22	545
		% within Race	24.1%	27.8%	22.8%	20.2%	24.6%
	30–34	Count	445	135	59	37	676
		% within Race	31.7%	26.6%	30.6%	33.9%	30.6%
	35–39	Count	287	71	33	17	408
		% within Race	20.5%	14.0%	17.1%	15.6%	18.4%
	40–44	Count	149	39	11	9	208
		% within Race	10.6%	7.7%	5.7%	8.3%	9.4%
	45–49	Count	59	12	7	5	83
		% within Race	4.2%	2.4%	3.6%	4.6%	3.8%
	50–54	Count	15	12	10	4	41
		% within Race	1.1%	2.4%	5.2%	3.7%	1.9%
	55–59	Count	8	15	5	3	31

	% within Race	0.6%	3.0%	2.6%	2.8%	1.4%
60–64	Count	2	3	0	1	6
	% within Race	0.1%	0.6%	0.0%	0.9%	0.3%
65+	Count	0	2	0	1	3
	% within Race	0.0%	0.4%	0.0%	0.9%	0.1%
Total	Count	1403	507	193	109	2212
	% within Race	100.0%	100.0%	100.0%	100.0%	100.0%

Table A3. Age group & sex crosstabulation.

Age Group Sex Crosstabulation					
		Sex		Total	
		Female	Male		
Age Group	20–25	Count	104	107	211
		% within Sex	12.2%	7.9%	9.5%
	26–29	Count	221	324	545
		% within Sex	25.9%	23.8%	24.6%
	30–34	Count	275	401	676
		% within Sex	32.3%	29.5%	30.6%
	35–39	Count	148	260	408
		% within Sex	17.4%	19.1%	18.4%
	40–44	Count	67	141	208
		% within Sex	7.9%	10.4%	9.4%
	45–49	Count	25	58	83
		% within Sex	2.9%	4.3%	3.8%
	50–54	Count	10	31	41
		% within Sex	1.2%	2.3%	1.9%
	55–59	Count	2	29	31
		% within Sex	0.2%	2.1%	1.4%
	60–64	Count	0	6	6
		% within Sex	0.0%	0.4%	0.3%
	65+	Count	0	3	3
		% within Sex	0.0%	0.2%	0.1%
Total	Count	852	1360	2212	
	% within Sex	100.0%	100.0%	100.0%	

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