

1 **Title Page (WITH Authors Details)**

2 **Title: Gender in the construction industry: Literature review and a comparative**  
3 **survey of men's and women's perceptions in UK construction consultancies**

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33 **Gender in the construction industry: Literature review and a comparative survey of**  
34 **men's and women's perceptions in UK construction consultancies**

35 **Abstract**

36 For more than two decades, construction industry leaders have made attempts to attract  
37 more women into professional roles to ease skills shortages and diversify the workforce.  
38 However, the number of women working in the industry has not improved significantly.  
39 This paper reviews previous literature on gender diversity in the construction industry  
40 and disseminates findings from a survey which investigated whether there are significant  
41 differences in self-perception between men and women in construction consultancies  
42 operating in the United Kingdom (UK). The survey questionnaire was completed by 60  
43 men and 57 women. Analysis of the result confirmed that women tend to follow 'zig-zag'  
44 career development paths and that 'global self-worth' of women over the age of 40 is the  
45 lowest among all ages. However, little variation was found on initiatives to improve  
46 retention of women in construction consultancies. The results reveal that both men and  
47 women regarded 'improved flexible working-arrangements', 'transparent promotion  
48 criteria', 'return to work training', 'outreach programmes to schools' as the most crucial  
49 initiatives to retain women. This reinforces the call for organizations to introduce  
50 innovative strategic plan to change the masculine culture of the construction profession  
51 and to modernise working practice away from the existing rather outdated traditional  
52 structure.

53 **Key words: Gender; Professional Roles; Self-perception**

54 **Subject headings**

55  
56 NT: Construction management  
57 NT: Personnel management  
58 NT: Resource management

59

60 **Introduction**

61 The UK construction industry employs 2.10 million people equating to 6.5 percent of  
62 the total workforce. It contributes £103 billion in gross value to the UK economy  
63 (Great Britain, Office of National Statistics, 2014). The industry experienced  
64 unprecedented growth in the 1990's up until the recession in 2008 which resulted in a  
65 widespread skills shortage. This crisis prompted industry leaders to implement new  
66 initiatives aimed at easing the skills shortage; one of which was an effort to diversify  
67 the workforce with measures being taken to recruit more women into the construction  
68 industry (Dainty and Edwards, 2003; Briscoe, 2005).

69 For the past three decades, there has been an emphasis on improving the  
70 construction industry and comprehensive initiatives and programmes have been  
71 established to target some of Egan's (1998) and Latham's recommendations (1994).  
72 Addressing the gender imbalance in the industry was something that Latham (1994, p.  
73 71) advised. This report recognized the omission of women as a disadvantage to the  
74 industry, making it impossible to obtain the best people when half the population is  
75 excluded. Despite global recessions, the construction industry is still experiencing a skills  
76 shortage throughout all levels from the trades through to office-based staff. The  
77 Construction Industry Training Board (CITB) reported that, despite the decreased  
78 construction output of recent years, there is still a need to recruit a skilled workforce. The  
79 annual recruitment requirement for 2013-2017 was anticipated to be 29,050 (CITB,  
80 2013). Assuming the economy improves over the next few years, construction output will  
81 increase elucidating a greater importance to invest in the development and training of an  
82 appropriately skilled diverse workforce.

83 Professional bodies such as the Royal Institution of Chartered Surveyors  
84 (RICS) have worked to contribute to the body of knowledge surrounding women in

85 construction through research, like Raising the Ratio, which was aimed at identifying  
86 why women (and men) leave the industry (Ellison and Cowling, 2006). Research  
87 performed by Kingston University and funded by the RICS found that women are  
88 leaving surveying in greater numbers when they are in their 40s due to a wide range  
89 of reasons. The top three reasons cited being: (1) ‘hours and conditions inflexible  
90 with the need to look after children’ (41 %), (2) ‘to spend more time with  
91 children/family’ (39%) and (3) ‘restricted career progression and lack of opportunity’  
92 (20 %) (Ellison and Cowling, 2006).

93         On the whole, educational initiatives aimed at increasing the proportion of  
94 women studying science and engineering have, to a certain extent, succeeded (Powell  
95 *et al.* 2005). However, this increase in female engineering and construction graduates  
96 does not equate to more female professionals in the construction industry; a disparity  
97 that has been sparsely researched. Over a 10-year period, the proportion of female  
98 students who were studying science, technology, engineering and maths (STEM)  
99 subjects increased by 55 percent (compared to 29 percent for male students) and the  
100 Equal Opportunities Commission (EOC) reported in 2005 that more women were  
101 entering higher education (Gurjao, 2011). Armed with these statistics and targeted  
102 initiatives towards women, one would assume that improvements have been made  
103 regarding gender diversity. In fact, the opposite is true, as the number of women  
104 working in the construction industry has remained relatively stable since the 1990s at  
105 between 9 and 12 percent, with the vast majority of roles being administrative and  
106 secretarial (Briscoe, 2005; Gurjao, 2011).

107         Fielden *et al.* (2000) argued that despite many female engineering students, the  
108 male-dominated ‘sexist’ image of the industry will continue to deter women from  
109 choosing to work in construction and change will only be realised when a change in

110 culture is embraced. Lu and Sexton (2010) concede that it is not surprising that past  
111 initiatives have been unsuccessful as they fail to acknowledge the complex journey  
112 many women currently working in the profession have taken.

113 This research has acknowledged four main reasons why the industry had failed to  
114 tackle the issue of women in construction, these are: (1) the industry failed to take into  
115 account the ‘zig-zag’ career development paths of women defines by ‘a dip and rise in  
116 self-perceptions of women across all ages’ (Frances, 2017; Lu and Sexton, 2010 and  
117 Powell *et al.* 2004); (2) the problem is mostly aimed at younger girls and school leavers  
118 and did not consider the varied background of many women (Cannon, 2014); (3) previous  
119 research did not take into account the differences in perceptions between men and women  
120 (Powell *et al.* 2004), despite previous speculation that reviewing the self-perceptions of  
121 men who hold the power in most organisations is an important step to improving the body  
122 of knowledge on gender diversity (Rumens, 2013); (4) the industry has not come up with  
123 a practical and effective strategic plan to prevent women from leaving the industry as  
124 they age following the ‘leaky pipeline’ theory (Morello *et al.* 2018; Gurjao, 2011; Jenson  
125 *et al.* 2005). The ‘leaky pipeline’ concept attempts to explain why more women choosing  
126 to study engineering do not result in more women in the industry and in senior positions,  
127 concluding that women are choosing to drop out or leave the industry at different stages  
128 of their career (Jensen *et al.* 2005).

129 Whilst previous research concentrated on finding out the problems and the  
130 barriers that influence professional women’s career advancement in construction and  
131 ways to retain them in the industry, little research has been conducted to understand  
132 how women in professional roles perceive themselves at different stages of their  
133 career. This paper reports on the state of the art literature review on gender in the  
134 construction industry and reveals the finding of a survey that was conducted in the

135 UK during 2016/17. The survey explored the perceptions of women in construction  
136 consultancies, comprising (project managers, architects, engineers and surveyors) and  
137 compared them to men's perceptions in the same discipline and age groups. The main  
138 aim is to provide more information for senior managers about how women perceive  
139 themselves across different stages of their career development and the initiatives that  
140 can retain them in the industry. The intention is to offer decision makers at senior  
141 levels an opportunity to broaden their horizon towards adopting innovative strategies  
142 to human resource management in order to reverse the current trend of  
143 underutilisation of female talent in the construction professions.

#### 144 **Literature review**

##### 145 **Gender roles and barriers to women in construction**

146 According to social learning theory postulated by Galea and Loosemoore (2006), gender  
147 is a self-perceived sense of maleness or femaleness that is learnt through socialisation and  
148 education and is socially determined by society's expectations of the roles of men and  
149 women. When considering the effect gender has in the construction industry, historically,  
150 construction work was a physically demanding job that favoured men. However, social  
151 stereotypes and norms play a large role in reinforcing the gendered workforce (Styhre,  
152 2011). The exact role gender theory and perceptions play in the construction industry is  
153 often debated and Clarke and Wall (2006) suggested that it has always had an influence  
154 in the type of work that is deemed acceptable for women to do in the industry. Even after  
155 the World War of 1939-1945, when women replaced the men who normally worked in  
156 the trades, women were excluded from the reconstruction projects that were required to  
157 rebuild Britain with unskilled men promoted to skilled positions over women regardless  
158 of ability (Clarke and Wall, 2006).

159           The perception of what women can do, based on their gender, is just one  
160 barrier to them in the industry. Barriers to construction experienced by women were  
161 researched in more depth by Dainty *et al.* (2000) who interviewed 41 matched pairs of  
162 males and females working in the industry to compare their careers and progression.  
163 The research concluded eight phenomena, which need to be overcome to enable  
164 women to progress within the industry. These phenomena were: (1) entrance to the  
165 industry; (2) entrance to organizations; (3) context of a career in construction; (4)  
166 structural organizational processes; (5) cultural organizational processes; (6)  
167 individual characteristics and circumstances as determinants of careers; (7) career  
168 strategies; (8) future expectations, opportunities and threats under career progression.  
169 Dainty *et al.* (2000) then mapped the vertical career progression of every informant  
170 against time from the informants' careers accounts. They found that women were to  
171 have progressed an average of one hierarchical level behind their male peers of  
172 similar age and experience. Dainty *et al.* (2000) concluded that, all attempts to attract  
173 more women should be diluted until structural and cultural changes have been  
174 realised.

175           One of the most widely cited barriers to women entering and working in the  
176 construction industry is its 'masculine-culture'. There is a large body of evidence to  
177 support the need for structural and cultural change to make construction more accessible  
178 and appealing to women. However, while solely relying on culture change as a solution, a  
179 number of issues remain. Naoum (2011, p. 145) suggests that the strength of an  
180 organisational culture is a result of the 'internalisation' and acceptance of the beliefs and  
181 values of the organisation by its members. In the context of the construction industry that  
182 is and has historically been, male-dominated, the deep-rooted masculine - culture is  
183 perpetuated by the 'internalisation' of the masculine attitudes and ideologies.

184 Furthermore, as cultural change is influenced by a variety of factors such as  
185 organisational characteristics and values, management strategy and leadership,  
186 operational and environmental influences, there are no guarantees that changes to policy  
187 and structure would result in a positive move towards gender diversity. Powell *et al.*  
188 (2010) argued that a greater understanding of gendered stereotypes is essential to work  
189 towards innovative initiatives that ‘challenge cultural norms and gendered stereotypes  
190 among all employees’ to ultimately improve gender diversity.

191 In recent research by Barreto *et al.* (2017), 20 barriers were identified. These  
192 barriers composed the statements of the questionnaire survey and the data was  
193 obtained from 429 professionals in the Peruvian construction industry. It was found  
194 that women face invisible barriers throughout their careers and have fewer  
195 professional opportunities than men. The main perceptual dissimilarities between men  
196 and women indicate that men interpret womanhood as a form of positive  
197 discrimination, which, far from being a professional barrier, is considered an  
198 advantage by them. Likewise, women agree that if they take maternity leave, they will  
199 suffer a loss in the hierarchical order; furthermore, the industry does not have flexible  
200 work schedules, childcare programs, or provisions for career breaks. Five underlying  
201 factors were extracted from the analysis: male oriented labour market, detrimental  
202 issues for being a woman, harsh working conditions in the construction industry,  
203 unfavourable perception of the construction industry, and high competitiveness of the  
204 construction industry. Results of Infante-Perea *et al.* (2016) also showed that both  
205 men and women perceive job market constraints and inadequate preparation as the  
206 two main career barriers.

207

208

209 **Well-being and conflict – a gendered difference**

210 Focusing on retention of the women that already work in the construction industry is  
211 paramount (Menches and Abraham, 2007). Its well-being and long-term sustainability  
212 to assure the ‘leaky pipeline’ phenomena does not continue (Gurjao, 2011). Equal  
213 concern is the inflexible working practices which often lead to problems regarding  
214 their work-life balance (Worrall *et al.* 2010). Age is a significant factor in women’s  
215 desire to continue their career in the construction industry. Recent study by Morello *et*  
216 *al.* (2018) found that women in the 18–24 and over 65 age groups have more  
217 frequently expressed an interest in leaving the industry than women between the ages  
218 of 25 and 54. Additionally, single women who had not been previously married  
219 remain in the industry in greater frequencies than married women.

220 Research on the well-being of construction professionals has found that burnout  
221 and poor work-life balance are commonplace in the industry as it is often driven by  
222 time and cost constraints leading to long working hours and stress. Such  
223 investigations have sampled the well-being of men, but women’s stressors and  
224 experiences are not well-documented or researched (Sang *et al.* 2004). The  
225 construction industry is linked to stressors like long working hours, job insecurity,  
226 poor professional worth, temporary working teams and a poor work-life balance  
227 (Sang *et al.* 2007 and Worrall *et al.* 2010).

228 The well-being of its employees is paramount to the survival of construction  
229 consultancy companies because people are their only asset. Styhre (2011) ruminates  
230 that traditional masculine ideology embodied in the construction industry perpetuates  
231 the paternalistic role of the site manager resulting in burnout, stress and health  
232 problems. This is so because the masculine ideologies denote the totality of norms,  
233 belief and assumptions that serve to enact specific images of, for example, leadership

234 work. In the case of the Swedish construction industry, the site manager's role is  
235 enacted as a paternal figure having full control of the situation, always in the position  
236 to take care of emerging and unforeseen events, and spending long hours at work.  
237 Such a site management role is thus reproducing gender ideologies, imposing  
238 '*expectations*' on individual site managers, and erecting entry barriers for women or  
239 individuals not willing to forsake family life. However, in recent research by George  
240 and Loosemore (2018), it was found that the focus of attitudes towards masculinity in  
241 the construction industry may be shifting to reflect trends in the wider population and  
242 may be more inclusive and less hegemonic than has been previously argued. It is also  
243 found that the focus of masculinity in the construction industry is closely related to  
244 the physical and high-risk nature of work and that sexuality and humour may also be  
245 an important source of masculine identity. These results are important since they  
246 contribute a more nuanced understanding of the dimensions and exact nature of  
247 attitudes towards masculinity in the construction industry.

248 Earlier in Australia, an on-line questionnaire survey was conducted to investigate  
249 whether women professionals in the construction industry differ from their male  
250 colleagues in the stressors faced at work and the degree of work-related psychological  
251 injuries suffered (Sunindijo and Kamardeenand 2017). The respondents comprised  
252 167 men and 110 women professionals working in the Australian construction  
253 industry. The results reveal that: (1) women professionals suffer more anxiety and  
254 acute stress symptoms than male professionals, but no significant difference is  
255 apparent between the genders in the level of depression suffered; (2) the top 10  
256 stressors at work facing construction professionals are the same for both genders, with  
257 time pressure, excessive workload, long work hours, and unpleasant work

258 environment being the critical issues; and (3) women professionals experience more  
259 discrimination, bullying, and sexual harassment.

260 Styhre (2011) suggested that a greater understanding of the role gender theory  
261 plays would help to benefit all operatives as the negative effects and social costs to the  
262 industry go beyond just excluding minorities. The masculinities in the industry can  
263 result in a negative impact for men and women and more needs to be done to  
264 understand the impact. Understanding the link between gender, communication and  
265 the high level of conflict is essential for those looking to attract more women into the  
266 construction industry. The communication styles of men tends to be more direct and  
267 confrontational as a result of playing in large groups as boys where there is a greater  
268 importance on visibility; women are more inclined to have an indirect, less physical  
269 style of communication with a tendency to avoid conflict (Galea and Loosemore,  
270 2006). There was a significant relationship between position in a company and a  
271 woman's self-identified communication style.

272 Just as the industry is dominated by masculinities, so is the communication style,  
273 with high levels of confrontation followed by appeasement in men-to-men conflict.  
274 Interestingly, when females are involved, there are lower levels of escalation of  
275 confrontation and aggression (Galea and Loosemore, 2006). In a research by Morello  
276 *et al.* (2018), it was found that women who were at higher levels within their career  
277 path, such as senior level and executive, perceived themselves as being more  
278 dominant in their communication style than those at lower levels. Also, women in the  
279 executive level self-identified as being agentic leaders more than those in lower-level  
280 positions, while principals and owners more commonly self-identified as being  
281 communal.

282       When looking at the well-being of women, Sang *et al.* (2007) interviewed a  
283 number of UK architects and concluded that women showed lower levels of job  
284 satisfaction, higher levels of work-life conflict and physical health problems  
285 associated with poor well-being like headaches and insomnia than their male  
286 counterparts. On the other hand, according to a study by Ortiz *et al* (2015), the  
287 majority of women in civil engineering faculties do feel affirmed and valued as  
288 employees because all factors resulted in more than 50% of the respondents being  
289 very satisfied or satisfied. However, there appear to be changes in perceptions as  
290 women progress in their careers and there are interesting variations in how satisfied  
291 women in engineering faculties are with different facets of their jobs.

292       In the USA, the link between job turnover and job satisfaction was explored  
293 by Dabke *et al.* (2008). Women were found to be satisfied with the nature of work in  
294 construction trades but were less satisfied with pay, benefits, job security, and  
295 availability of separate, hygienic sanitary facilities. Co-worker support or treatment  
296 was not important to women, and they were satisfied with people on the job. Women  
297 who worked outside the local area were more satisfied with the nature of work and the  
298 job in general. In further research in the USA by Malone and Issa (2013), it was found  
299 that the factor with the most pronounced influence on satisfaction with an employer  
300 was whether the respondent had earned a college degree or trade certificate.  
301 Respondents with a college degree or a trade certification were more than four and a  
302 half times more likely to respond as satisfied with their current employer than those  
303 who did not have a degree or certification. Further empirical research is needed to  
304 explain the claim that satisfaction among women is associated with the educational  
305 level.

306

307 **Coping strategies and mechanisms**

308 Sheppard (1989) described coping as a strategy of ‘blending in and claiming a rightful  
309 place’. Such a ‘blending’ depended on very careful management of being feminine  
310 enough in terms of appearance, self-presentation, acceptance of different expectations  
311 and of motherhood responsibilities, while at the same time being business-like enough  
312 (competent, promotion aspirations), in order to claim a rightful place in the  
313 organisation. Arguably, female in engineering studies are aware that they are entering  
314 into a male-dominated industry. In a research by Keen and Salvatorelli (2016) into  
315 discrepancies between female student perception and the reality of the engineering  
316 industry, it was found that students in the engineering industry are prepared for the  
317 realities of the profession, including the working hours, compensation in the form of  
318 pay, and some benefits, such as health and disability insurance. This being said, there  
319 were some areas of fairly large discrepancy between what students anticipate and  
320 what is indicated as reality by industry professionals. The most prevalent difference  
321 appears in the areas of academic degree attainment, professional engineering licensure  
322 and employment benefits, including paid maternity leave, flexible work hours, part-  
323 time employment, and leave without pay.

324 Several studies have been conducted into strategies and mechanisms to  
325 overcome both the barriers and ways to cope in male dominated environments such as  
326 construction (Watts, 2012; Styhre, 2011; Powell *et al.* 2005; Sang *et al.* 2004 and  
327 Dainty, 2000). Women who seek entry into male-dominated cultures either have to act  
328 like men in order to be successful, or leave if they are not adaptable to the culture,  
329 alternatively, they can remain in the industry without behaving like men but  
330 maintaining unimportant positions (Bennett *et al.* 1999). According to Powell *et al.*  
331 (2005), previous coping solutions focus attention on the women themselves: they

332 could for example choose appropriate behaviours, work extra hard, walk the tight rope  
333 and balance their gender and professional identities. It can be argued that these  
334 strategies are just ‘coping mechanisms’, rather than solutions to the problems women  
335 face to challenge the existing culture and structures in engineering.

336 In an interview with female students conducted by Powell *et al.* (2005) they  
337 were asked about their changing behaviour and any coping strategies that they had  
338 developed. An interesting comment was “it is actually a case of everyone else getting  
339 used to you rather than adjusting your own behaviour.” That interviewee went further  
340 to imply that to act ‘too feminine’ might affect how colleagues treat you, "as long as  
341 you don’t go out there thinking that you’re going to get special treatment, it’s all  
342 fine.”

343 Other gender stereotype often mentioned in research is that of the ‘queen-bee’  
344 syndrome (Sinclair, 2005 and Whittock, 2002) where women see their status in the  
345 industry as a novelty and align themselves more often with male colleagues over female  
346 counterparts. This can result in the ‘queen bee’ perceiving other women as weak, for  
347 failing to achieve what they have and resisting the entrance of other women for fear of  
348 losing their *status quo* (Powell *et al.* 2010). When women perceive other women with a  
349 gender bias at a subconscious level, ‘women internalise disparaging cultural attitudes and  
350 then echo them back’ making women both the victim and the perpetrator of sexism and  
351 gender bias (Sandberg, 2013 p. 165). As this coping mechanism is often used by women  
352 on a subconscious level, researchers will only be able to test if frequency of ‘queen-bee’  
353 syndrome decreases with increased gender diversity when more women actually stay in  
354 the industry. Previous research showed that women experience increased visibility in the  
355 industry, resulting in the pressure to over-perform which is the basis of the ‘queen bee’  
356 theory (Whittock, 2002). Women who choose construction or engineering from a young

357 age have worked hard to prove themselves during their studies (Gurjao, 2011) leading  
358 one to believe that their self-perception would be higher than their male counterparts of  
359 the same age group.

### 360 **Career paths**

361 The current structure of work is based on the traditional, linear career paths of  
362 men and fails to validate the path of many women who often benefit from non-  
363 traditional working relationships. The idea that flexible working is only sought by  
364 women who want to have families is not only incorrect but undermines the promotion  
365 and development of all women regardless of their personal circumstances.  
366 Furthermore, this notion acts to invalidate the desires of many men who wish to take a  
367 more active role in child-rearing. Powell *et al.* 's (2004) research on a large sample of  
368 female engineering students concluded that the 'one size fits all' approach for  
369 recruitment does not work as women have different needs and expectations from men.  
370 In a similar study by the Lloyds Banking Group, it was acknowledged that the path  
371 women take in their careers is varied as they are more likely to take time off work for  
372 children, resulting in a career that follows a 'zig-zag approach' (Cannon, 2014).

373 The majority of previous policies and initiatives failed to fully account for the  
374 gender differences because they focus largely on school-leavers and junior females.  
375 This failing was hypothesised more than 20 years ago by researchers who concluded  
376 that, 'the overall progression of women's careers has received little attention resulting  
377 in a lack of information on vertical segregation within the industry and individual  
378 organisations' (Sommerville *et al.* 1993). Lu and Sexton (2010) speculate further that  
379 the initiatives aimed at increasing the number of women in construction do not bring  
380 about sustained growth because they fail to acknowledge that the career path of  
381 women is typically more varied, with decision making being a 'product of

382 serendipitous circumstances and choices'. By developing a career model for senior  
383 female managers in small construction firms, interviews carried out by Lu and Sexton  
384 (2010) confirmed that career paths contained many turning points and did not follow a  
385 linear path. O'Neil and Bilimoria (2005) discuss how women's careers develop over  
386 time, particularly with regard to the impact of career contexts (societal, organisational  
387 and relational) and women's own changing images of their careers and career success.  
388 They proposed a three-phase age-linked model for women's career development, these  
389 are: the idealistic achievement phase (phase 1), the pragmatic endurance phase (phase  
390 2) and the re-inventive contribution phase (phase 3).

391         The traditional concept of upward, linear progression is based on the working lives  
392 of men and leads to marginalisation and a sense of failure for women who do not follow  
393 this structure (Caven, 2006). Non-traditional working arrangements by women, for  
394 example part-time or temporary work, is seen by others as a way to work around family  
395 commitments. However, Allen and Truman (1993) highlighted that often women see their  
396 varied commitments as integrated and work or family is not necessarily more important  
397 than the other. By assuming that women want alternative working solely as a response to  
398 family commitments not only fails to recognise the non-linear career path that many  
399 women take, but it acts 'to devalue women's contributions to work in a way that does not  
400 exist for men, acting as a constraint on their careers' (Caven, 2006; Lu and Sexton, 2010).  
401 Craven (2006) further concluded that non-traditional working patterns could actually  
402 enhance a women's career development as women are able to form a career on their own  
403 terms.

404         Caven's research aligns with *Cracking the Code*, a study of companies that employ  
405 680,000 employees conducted by KPMG and KPMG on behalf of the 30% Club, a group  
406 whose goal was to have women represent 30 percent of FTSE-100 boards by 2018.

407 Predictably, *Cracking the Code* reported that men are promoted more than women and  
408 are 4.5 times more likely to make it to executive level regardless of skill (Young Samuel  
409 Chambers (YSC) and Keith Peat Marwick Goerdeler (KPMG), 2014). Surprisingly, this  
410 held true for all women, even ones without children, concluding that the often-cited  
411 excuse of child-rearing cannot be blamed for women’s lack of progression. Rachel Short  
412 of YSC revealed the opposing gender paradigms as a result of parenthood, ‘the  
413 stereotypical reaction is that men are seen as becoming the breadwinner when they  
414 become a parent, whereas women are seen as becoming care-givers’. In a similarly vein,  
415 Urwin, (2014) found that men want to be more involved with child-rearing (and would  
416 benefit from more flexible working arrangements) and women wanted to take a more  
417 active role in their careers which are two powerful messages that all industries must  
418 embrace to ensure a sustainable, productive workforce .

419 In addition to the advances in career theories and research reviewed above, some  
420 scholars argue that the individual perspective of career emphasises the responsibility  
421 of the individual to plan and manage career throughout life. Therefore, one stream of  
422 studies has shifted the attention toward different ways in which individuals can  
423 manage their career (King 2001). However, environmental and organisational changes  
424 have impacted the need to develop a much broader concept of career. Contemporary  
425 literature adopts the view that career is “an individual’s work-related and other  
426 relevant experiences, both inside and outside organization, that form a unique pattern  
427 over individual’s life span” (Sullivan and Baruch, 2009). Hence, this definition  
428 embraces both individual and organisational perspectives.

#### 429 **Gender perception and self-perception**

430 Analysis of self-perception of both men and women across different age groups and  
431 experience would help to elucidate whether both genders are affected in the same

432 way. The fact that men and women are not identical but offer different abilities that  
433 need to be equally embraced is a key message that does not seem to be taken on board  
434 when initiatives aimed at gender equality are being considered and formatted. French  
435 and Strachan (2015) confirmed that the impact of the equality initiatives on the  
436 representation of women in non-traditional work areas and in management is limited.

437 Agapiou (2002) asserted that the workforce in the construction industry is a  
438 result of traditional recruitment perpetuated by management and questioned ‘why they  
439 continually re-create an all-male workforce and whether they can make any attempts  
440 to do otherwise’. After a series of interviews that were carried out in Scotland aimed  
441 at exploring if the existing attitudes of the workforce are acting as a barrier to  
442 management of change, it was found that overall, the male interviewees  
443 acknowledged that there is a place for women in the industry and that their skills are  
444 useful to the trades. Whilst few men were ‘openly hostile’ to the idea of women in the  
445 trades, they often cited other reasons why women should not work in trades like issues  
446 of strength and ability or lack of innate ability to use tools and they did not feel they  
447 were being prejudiced to hold these views. On the other hand, women stated that  
448 concessions should not be made to women and that they did not agree with ‘the over-  
449 feminist type’ that ‘whine’ or ‘complain’. However, this is somewhat contradictory  
450 when they also cite having to be able to ‘take a joke’ to fit in, and having to be better  
451 at their job than the men to prove themselves. Agapiou (2002) concluded that the  
452 culture of the industry is changing and ‘equal opportunities should be understood not  
453 as men and women being identical, but being equally important to the workforce  
454 because of the different capabilities and perspectives’, a notion that is in fitting with  
455 this research report.

456 Not only is the perception of the workforce important to determine how or if

457 gender diversity is a possibility in construction, it is also necessary to realise the  
458 changing nature of the workforce. Traditional working arrangements are no longer the  
459 norm, with evidence suggesting that the younger generations do not hold the same  
460 values as their parent, that is, a secure job for life, and are putting greater importance  
461 into working arrangements that offer a better work-life balance (Lingard and Francis,  
462 2005 and Worrall *et al.* 2010). Arguably, more men than women want policies aimed  
463 at childcare support, suggesting that this paradigm shift is true for men and women  
464 alike. Rumens (2013) suggests that more needs to be done to determine how men  
465 acknowledge their own gender in an attempt to better understand how particular  
466 masculinities harmfully impact both sexes in the construction industry. According to  
467 Oliver (2013), men still need to be part of the decision making process but  
468 nevertheless, understanding the perceptions of these decision makers is central to  
469 achieving a more gender diverse workforce.

470 Finally, the notion of meritocracy compounds the issues surrounding gender  
471 diversity as companies seek to ‘play fair’ in a historically unfair playing field. The  
472 issue of merit is debatable. In the USA, Castilla and Benard (2010) found that even  
473 though the intention of merit-based policies and initiatives is to motivate staff and  
474 ensure rewards based on merit, they can increase bias and reduce equality if there is  
475 limited accountability and transparency. The use of performance appraisal systems  
476 has also been cited in the UK construction industry as a barrier for women’s  
477 progression as male managers are more likely to reward behaviour which matches  
478 their own, giving women lower appraisal scores and allocating less training (Dainty *et*  
479 *al.* 2000).

480

481

482

483 **Research methodology**

484 Before discussing the methodology in detail, it is helpful to address psychology as this  
485 research involves ‘self-assessment’ and ‘self-reporting’ of an ‘individual’s role’. Baron  
486 and Byrne (2000) argue, “self is a cognitive framework that determines how we process  
487 information about ourselves, including our physical attributes, personality traits, roles,  
488 motives, emotional states, self-evaluations and abilities”. Similar to Chandra and  
489 Loosemore’s (2004) study (who compared women in the construction industry with  
490 women in other male-dominated (legal) and female-dominated (nursing) industry), this  
491 research used self-report methods of data collection which relies on respondents  
492 answering questions about their own belief and behaviour. In self-report methods, the  
493 respondent becomes both the subject and object of study, which contrasts to inferential  
494 techniques, which rely on others’ reports or observations about behaviour.

495         According to Brinthaup and Erwin (1992), there are two types of research  
496 methods for self-reporting: (1) *spontaneous self* and (2) *reactive, evaluative self*. In a  
497 spontaneous self method, the respondent is usually asked to respond to open-ended  
498 questions relating to self-descriptions. In the reactive, evaluative self approach, the  
499 respondent is asked to make judgments about their competence or adequacy across a  
500 variety of content areas. This research adopted the latter approach because it enabled  
501 more definitive comparisons to be drawn between different respondent groups, which  
502 was one of this research aims. In adopting the reactive, evaluative self approach, data was  
503 collected via questionnaires because of the need to collect a large geographically  
504 dispersed sample. Furthermore, with effective design, anonymity was more easily assured  
505 and honest responses more likely.

506 The questionnaire adopted in this study consisted of three parts: Part (i) was  
507 related to general information; Part (ii) was related to self-perception and Part (iii) was  
508 related to diversity-specific initiatives. The questionnaire was designed with an  
509 assortment of Likert-scale questions (See Naoum 2019, p95). The following provides  
510 further details of the questionnaire.

511 *Part (i) – general information*

512 The general information section served a dual purpose in the research process. In the first  
513 instance, this section was used to gather baseline information about the respondents.  
514 Secondly, the questions were intended to ease the respondent into the survey and get  
515 them thinking about themselves and their background. In doing so, it was felt that they  
516 would be more comfortable and prepared to answer the questions with greater honesty.  
517 The general information section questions pertained to: gender age; relationship status;  
518 highest level of education; educational background in construction/engineering; area of  
519 the business currently employed; occupational grade; years spent in current role; years of  
520 experience in the construction industry; professional membership.

521 *Part (ii) – self-perception survey*

522 The second part of the questionnaire was aimed at ascertaining the self-perception of the  
523 respondents to distinguish if there are differences between how men and women perceive  
524 themselves, in general and throughout their careers. The survey instrument used was the  
525 ‘updated’ Messer and Harter’s (2012) Self-Perception Profile questionnaire (SPP). As far  
526 as is known, the SPP represents the only self-concept measurement instrument that is  
527 specifically designed for full-time working adults. It comprises 50 Likert-scaled questions  
528 and asked people to rank the relative importance of 12 self-concept domains as described  
529 in Table 1.

530 *Part (iii) – Gender Perception on diversity initiatives.*

531 The last section of the questionnaire was designed to gain an insight into the perception  
532 of gender diversity in the industry as well as exploring the respondents' thoughts on  
533 initiatives aimed at increasing it. The literature review derived 14 initiatives and the  
534 respondents were invited to rate their perception by ticking 'strongly agree', 'neither  
535 agree nor disagree' 'strongly disagree' to each initiative. The questions in this section  
536 were related to a) the industry in general; b) women's personal situations; c) the  
537 organization itself (see details of the questions in Table 4 and method of analysis below).

538 *The research sample*

539 In order to obtain a set of gender data that can be statistically tested of men and women  
540 across all occupational grades and ages, the survey questionnaire was compiled in Survey  
541 Monkey (an on-line survey website). The questionnaire was distributed to 136 men and  
542 103 women working in construction consultancy companies. Names of the companies  
543 were obtained from a population of top consultants operating in the UK published by the  
544 Building Magazine [www.building.co.uk/data/top-150-consultants](http://www.building.co.uk/data/top-150-consultants). These selected  
545 companies were homogeneous in their characteristics in that they are all multinational,  
546 offer similar services with a large turnover and have a large number of employees. The  
547 respondents were stratified in terms of age, occupation, marital status, academic degree  
548 and experience. The usable response rate was 48.9 % which provided a sample of 117  
549 questionnaires, 60 in the men category, 57 in the women category. The composition of  
550 the research sample is shown in Table 2.

551 *Method of analysis*

552 As mentioned above, this study adopted the same methodology by Messer and  
553 Harter's (2012) on self-perception profile for adults. The 'updated' questionnaire was

554 used in this survey that comprised 50 Likert-scales questions. Some questions were  
555 reworded to fit construction consultants. Responses were asked to rate the relative  
556 importance of 12 self concept domains (described in Table 1). The rating of the  
557 domains was assigned scores as strongly agree = 4 points, agree = 3, disagree = 2 and  
558 strongly disagree 1. Similar to Messer and Harter's (2012) research, no middle or  
559 neutral scale was included in the Likert-scales in order to provide a sharp and clear-  
560 cut self-perception. A number of inferential statistical tests were considered to  
561 determine the significant variance between the two samples. The *t*-test was selected as  
562 it is a robust test with respect to the variances in the mean scores of the two groups  
563 being compared (Naoum 2019, p 128). The data was first tested for skewness to  
564 ensure that the sample did not violate the normality assumption. The authors tested for  
565 equality variances when running the *t*-test procedure (this produced a significance *p*  
566 value which if more than 0.05 indicates unequal variances and the null hypothesis was  
567 accepted of no difference and if less than 0.05 indicates equal variance and the null  
568 hypothesis was rejected).

569         The mean scores of Part (iii) of the questionnaire that aimed to compare  
570 gender perception on diversity initiatives was calculated and ranked to measure the  
571 amount and significance of a correlation between the ranking of the two samples on  
572 14 initiatives (see Table 4). Here, the 'Spearman rho' ranking correlation was applied  
573 to test for significance.

574

## 575 **Discussion of results**

### 576 *Self-perception of men versus women*

577         The *t*-test result did not show a significant difference in the mean scoring  
578 between the two genders in their perceptions to sociability; job competence;

579 nurturance; adequate provider; morality; household management; intimate  
580 relationships; intelligence; sense of humor. Nine out of twelve domains, which are  
581 core for the two respondent groups, were very similar in their scoring among women  
582 and men (See Table 2). This result indicates that, despite the considerable barriers of  
583 women to entry and progress in construction as a career, their self-perceptions do not  
584 seem to be different from men, except for i) athletic ability i.e. physical capacity (the  
585 difference is significant at  $P < 0.001$ ); 2) physical appearance (at  $0.01 < P < 0.001$ ) and  
586 3) global self-worth (significant at  $0.05 < P < 0.02$ ). Further analysis into self-perception  
587 of women across their careers revealed that the career path of women is non-  
588 traditional and follows a sharper 'zig-zag' pattern when compared with men.  
589 Although men seem to experience dips in self-perception, they tend to occur at  
590 different ages across all domains and do not appear to follow the same trajectory as  
591 women. The domains of Job competence, morality and sense of humour dip in men at  
592 an earlier age than women, particularly at the age of (25-34). The *t*-test was applied on  
593 the data and the difference was high significance at  $(P < 0.001)$ . Therefore, it can be  
594 concluded that gender do differ in their career paths where they show a deep dip at  
595 different ages.

596         The Physical Capacity that is perceived significantly higher in men, may not  
597 be surprising due to the gender stereotype of men have been more involved in sport  
598 and other physical activities (Rumens, 2013). However, what is interesting is that men  
599 are significantly happier with their physical appearance than women within the same  
600 age group. This may be a consequence of men's greater confidence or their higher  
601 standing in the industry. Happiness in physical appearance could be a reflection of the  
602 global self-worth core where the difference for the two respondent groups was  
603 significantly different.

604 ***Global self-worth***

605 Global self-worth was described as the “individual’s global perception of  
606 worth, independent of any particular domain of competence or adequacy. It is tapped  
607 by items such as liking the way one is leading one’s life, being pleased with oneself,  
608 and liking the kind of person one is” (Messer and Harter, 2012). This was examined  
609 across all age groups to find out if global self-worth differs at different ages among  
610 both samples. Analysis of result showed that this domain scored the highest for young  
611 men with a mean of 3.50 (standard deviation of 0.59) as well as young women  
612 reported the same mean score of 3.50 (standard deviation 0.41). This suggests that, at  
613 a young age there is no difference in global self-worth between genders and one can  
614 assume they start out their careers on equal footing. However, when comparing the  
615 mean scores across all age groups, there was a clear trend that women’s perception of  
616 global self-worth decreases at older ages from a high of 3.50 at ages 18-24 to 3.00 at  
617 ages 45-54 (see Figure 1a). On the other hand, men did show a slight decrease in their  
618 self-perception of global self-worth from ages 18-24 (3.50) to ages 25-34 (3.42),  
619 before increasing with every age group thereafter (see Figure 1b). In fact, out of all  
620 the age groups surveyed, men ages 55-65+ scored the highest on global self-worth  
621 (3.52).

622 This finding corresponds very closely with the previous research by the earlier work  
623 of Ellison and Cowling (2006), Lu and Sexton (2010) and Powell *et al.* (2004). These  
624 previous research concluded that the majority of women tend to leave the industry by the  
625 age 40 years old. In light of this, effective strategic plan, (such as training and changing  
626 the working practice away from the traditional structure during the ages of 35-44) would  
627 have a considerable impact on retaining the representation of women in the construction  
628 industry.

629 The result of this research also aligns well with the ‘leaky pipeline’ theory by Gurjao  
630 (2011) and Jenson *et al.* (2005). As noted earlier, the ‘leaky pipeline’ concept attempts to  
631 explain why more women who chose to study built environment and engineering do not  
632 result in more women in the industry and in senior positions, concluding that women are  
633 choosing to drop out or leave the industry at different stages of their career. Therefore, it  
634 can be argued that the ‘leaky career pipeline’ is a multilayer problem that involves the  
635 individual, family, society, institutions and governments. Hence, the problem needs to be  
636 addressed on multiple fronts, from the grass-roots to policy levels. The role of good  
637 mentoring by compassionate people in enabling women to retain or excel in construction  
638 careers has been recommended in recent research such as Francis (2017). However, it can  
639 be argued that concentrating solely on mentoring, will not assist in their advancement per  
640 say but rather keep them from leaving the industry.

641

#### 642 ***Comparing Self-perception of women with and without a background in construction***

643 This issue was analysed by comparing the mean domain scores for job competence of  
644 women who testified to not having a background in construction or not studying  
645 construction or engineering from a young age versus women who did. Analysis of the  
646 results did not show conclusive trends across the two sample groups. When viewing  
647 the mean scores for women across their careers, Job Competence in women who did  
648 not have a background in construction or engineering *fluctuates* across their careers.  
649 These women seem to hit low scoring from ages 35-44 (2.46) whereas women who  
650 choose construction at a young age actually reported higher scoring during the same  
651 period (3.32). This suggests that women ages 35-44 who have a non-cognate  
652 background require a unique strategy to motivate them not to leave the industry  
653 during that age. Therefore, more research would be recommended to determine the

654 exact cause for this drop in job competence rating among women and the best way to  
655 support this demography to avoid more women leaving the industry. Dainty and  
656 Edwards (2003) as well as Lu and Sexton (2010) suggested training is the most  
657 effective solution to attract new talent through non-cognate professionals with  
658 transferable skills. On the subject of comparing the managerial competencies of  
659 project managers in the USA, a study by Arditi and Balci (2009) found that female  
660 project managers do not differ much from male project managers in terms of their  
661 managerial behaviours but performed better in “sensitivity,” “customer focus,” and  
662 “authority and presence.”

663

664 ***Perception of the gender split in the industry.***

665 This section of the questionnaire was designed to find out if women and men perceive the  
666 gender split in construction differently. 70.9% of women felt that gender diversity is an  
667 issue that needed remedying compared to just 39.7% of men. This statistic is worrisome  
668 to individuals in the industry that are working hard to increase diversity as it would  
669 appear that the majority of men either ‘do not agree’ or are ‘unsure’ that diversity is an  
670 issue in construction. Furthermore, the results did not show significant difference in  
671 views among men across ages, occupational grade or years in the industry. This finding is  
672 concerning as it suggests that age, grade and experience do not have an influence in the  
673 way men perceive gender diversity. It is concerning because this would suggest that the  
674 recent gender diversity and equality initiatives at the professional level have done little to  
675 shift relative attitudes towards masculinity at professional level. This, in turn, indicates  
676 that current initiatives to address gender diversity may be misdirected or at the very least,  
677 need to be broadened to change perceptions of masculinity.

678           86.3% of women and 75.9% of men perceived that the percentage of women in  
679 the industry to remain within 10 % and most would hold administrative positions.  
680 This finding supports the earlier survey by Briscoe (2005) that showed 50 % of all  
681 women in construction work in administrative and secretarial occupations, whilst only  
682 14 per cent are employed in professional and associate occupations. 13 per cent are  
683 employed as managers and, of these, a small number are self-employed and managing  
684 micro enterprises. Less than 5 per cent of all women are employed in skilled  
685 construction and related trades, and this proportion is mirrored by the relatively small  
686 number of women trainees in the manual trades.

687

688 ***Perception on the use of quotas and merits to improve gender diversity.***

689           Unsurprisingly, there was an overall agreement among women with the use of  
690 quotas and merits to promote females in construction. On the other hand, only a few men  
691 supported this notion with a majority of 81% were against it. When the data was  
692 statistically tested, the result was found to be significant at ( $P < 0.5$ ) leading to conclude  
693 that there is a difference in views among women and men in relation to quotas and merits  
694 to promote women in construction professions. The debate about setting targets and  
695 quotas to increase women in leadership positions is compounded by the notion that  
696 promotion should be based on merit. The prevalence of the word ‘merit’, or words of  
697 similar meaning like ‘best fit for the job’ were frequently cited within the comments  
698 section of this survey. This is in support of previous research by Dainty *et al.* (2000),  
699 Castilla (2008), Castilla and Berard (2010) in that, inherit bias in performance appraisals  
700 and evaluations prohibit equal reward for equal performance which is a particular  
701 problem in the construction industry.

702 ***Comparison of Gender Perception on diversity initiatives.***

703 The last section of the research questionnaire proposed 14 initiatives derived from the  
704 literature review and asked the respondents to express their perceptions on whether these  
705 initiatives would improve the retention of women by answering ‘strongly agree’, ‘neither  
706 agree nor disagree’ ‘strongly disagree’ (see the 14 initiatives and the calculation of *Rho*  
707 correlation in Table 3). In general, the initiatives proposed were equally supported by  
708 both male and female except for ‘Bring your child to work day’ that was ranked the  
709 lowest by both samples. Both men and women regarded ‘improved flexible working  
710 arrangements’, ‘transparent promotion criteria’, ‘return to work training’, ‘outreach  
711 programmes to schools’ as the most crucial initiatives to retain women in construction  
712 consultancies. When the data was statistically tested to find out if men and women differ  
713 in their ranking using the spearman *rho* correlation, the results did not show a significant  
714 difference and therefore it can be concluded that both genders gave similar weightings to  
715 the 14 initiatives ( $Rho = 0.9$ ). However, it is worth highlighting here that there was a  
716 small difference in ranking of three initiatives across the genders. Women gave higher  
717 ranking than men to ‘transparent promotion criteria and feedback’, ‘improved  
718 mentoring/sponsorship’ and ‘better maternity / paternity benefits’. These three initiatives  
719 are related to the 'organization' which leads to suggest that women seem to be more  
720 focused on ‘fix the organization first’ than 'fix the industry' or 'fix the women's personal  
721 situation' (see Table 4 for details). This finding corresponds closely with the recent  
722 findings of Quelhas *et al.* (2019) who concluded that, it is extremely important to  
723 understand organizational behaviour in the face of many challenges, such as diversity of  
724 the workforce (for example, in gender, age, and ethnicity). Organizational behaviour  
725 provides a complex system to help explain, anticipate, and control its culture by  
726 comprising the whole system of variables such as organization’s structure, set of  
727 practices, policies and procedures.

728

729

730 **Conclusion**

731 This paper has reviewed and reported previous research on gender in the construction  
732 industry and revealed the finding of a survey into the self-perceptions of women in  
733 construction consultancies and compared them to men's self-perceptions in the same  
734 discipline and age groups. The paper also explored genders' perceptions on different  
735 diversity initiatives to improve retention of women in the construction industry. Analysis  
736 of the results revealed that both men and women perceived the percentage of women in  
737 the industry to remain within 10 %. In addition, 70.9% of women felt that gender  
738 diversity is still a serious issue that needed remedying compared to just 39.7% of men.

739 The result also showed that there were overall similarities between the self-  
740 perception profiles of men and women with regards to 9 out of 12 domains considered.  
741 The most significant factor in this research was found in the global self worth of women.  
742 At a young age there seems to be no difference in global self-worth between genders and  
743 one can assume they start out their careers on equal footing. However, when comparing  
744 the mean scores across all age groups, there was a clear trend that women tend to follow a  
745 'zig-zag' career development path and that the 'global self-worth' of women over the age  
746 of 40 is the lowest among all ages. The general career path of women also found to  
747 follow a pattern of dip and rise in self-perception across all ages. This suggests that the  
748 career path of women is non-traditional and follows a 'zig-zag' pattern when compared to  
749 a relatively steady path for men. This leads to confirm previous research in that a 'one  
750 size fits all' approach does not address the problem to retain women in the construction  
751 industry as they do not consider the non-traditional 'zig-zag' career path of many women.  
752 For example, the fact that women's global self-worth decreases with age and self-

753 perception largely follows the same 'zig-zag' path as career development are strong  
754 indications that more must be changed to support women through the dips in their career  
755 development which usually happens after child-bearing years (ages 35-44). One such  
756 change is in the structure of the organization and the operation of corporate policies and  
757 procedures.

758 Both men and women regarded 'improved flexible working arrangements',  
759 'transparent promotion criteria', 'return to work training', as the most crucial initiatives  
760 to retain women in construction consultancies. Among other important initiatives  
761 highlighted by the female sample are 'transparent promotion criteria and feedback',  
762 'improved mentoring/sponsorship' and 'better maturity / paternity benefits'.

763 A high proportion of both men and women have also added 'merit' or words of  
764 similar meaning in the further comment section of the questionnaire. They emphasised  
765 that merit is a crucial criterion that the organization should use for recruitment and  
766 promotion. This highlights that men and women alike believe that we live and operate in  
767 a meritocracy. Tackling the societal myth of meritocracy could lead to more progressive  
768 views on how to address gender diversity. The fact that women ranked 'transparent  
769 promotion criteria and feedback' the highest of the initiatives aimed at gender diversity,  
770 confirms that women would greatly benefit from a system based on merit.

771 In light of this research outcome, it can be concluded that the issue of gender in  
772 construction falls under three main categories, namely, a) the industry in general; b)  
773 women's personal situations; c) the organization itself. Critical appraisal of the literature  
774 review and the general observation that came up from this research tend to lean more  
775 towards 'fix the organization first'. Therefore, it would seem logical for organizations  
776 within the construction industry to introduce an innovative "Strategic Human Resource  
777 Management System" (SHRMS) to effectively implement the business plan concerning

778 the management of personnel, bearing in mind the criteria of gender equality as an  
779 integral element. The suggested concept of SHRMS will support the overall  
780 organizational strategy and the development of changing culture. The system will in turn  
781 incorporate important areas that deserve serious attention such as the gender issue in  
782 construction. That involves proper strategic planning to modify and modernize current  
783 practices, workplace procedures, training and mentoring, more flexible organizational  
784 structures to account for the ‘zig-zag’ career paths of women who aren't interested in a  
785 linear path for whatever reason, staff appraisal and criteria for promotion to ensure  
786 equality and fairness of women in the organization.

#### 787 **Date availability statement**

788 All data, models, and code generated or used during the study appear in the submitted  
789 article.

790

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