DEMOGRAPHIC ATTRIBUTES INFLUENCE ON HEALTH AND SAFETY PRACTICES FOR SMALL AND MEDIUM CONSTRUCTION ENTERPRISES

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There is paucity of research on demographic attributes on health and safety (H&S) practices. Hence, the purpose of this study was to investigate the influence of demographic attributes on the H&S practices within small and medium construction enterprises (SMEs) in South Africa. A mixed method approach was used i.e. Delphi and questionnaire survey. A structured questionnaire consisted of 31 H&S practices/measures. They were categorized in five major H&S practices. The questionnaire was developed from extensive review and the participation of 20 purposively sampled H&S experts, in four iterative rounds of Delphi survey. The questionnaires were distributed to a total of 1,450 conveniently sampled SMEs. 228 questionnaires were returned of which 216 responses were usable. The findings imply that upper management commitment and involvement in H&S, employee involvement and empowerment in H&S, project supervision, project H&S planning and communication in H&S and H&S resources and training were retained as reliable and valid H&S practices. However, multiple linear regression analysis established demographic attributes i.e. experience in the construction industry, education level and the number of employees in the organization was not good predicators of the H&S practices.

Keywords: demographic attributes, health and safety practice, small and medium construction enterprise

INTRODUCTION

The South African small and medium construction enterprises (SME) sector is described as largely underdeveloped and lacking the managerial and technical skills and sophistication enjoyed by larger well established contractors. The SMEs are left on the periphery of the mainstream economy and do not participate fully in the economy (Department of Public Works, 1999). Martin (2010) opined that lack of knowledge including knowledge of pricing procedures, contractual rights and obligations; law,

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management techniques and principles as well as technology were a challenge to SMEs. Despite these general challenges faced by SMEs, the CIDB report 2008 highlighted specific challenges faced by small contractors in managing H&S. Anecdotally the report indicated that medium to large contractors and subcontractors working with large contractors tend to address H&S to greater degrees than small contractors, emerging contractors, as well as the majority of housing contractors (Construction Industry Development Board, (CIDB, 2008).

Construction sites in South Africa continue to be dangerous workplace in the economy (CIDB, 2004). The Department of Labour (DoL, 2012) indicated that in the period 2007 to 2010 the construction industry incurred 171 fatalities and 755 injuries. The industry further paid more than R287 million for occupational injuries in 2010/2011.These statistics are inclusive of SMEs. This poor H&S performance has therefore driven H&S stakeholders especially the South African government to take H&S seriously. Arguably, the poor H&S performance could inevitably be helped by the use of valid and reliable H&S practices.

Health and safety practices

Teo and Ling, (2006) developed a model to measure the effectiveness of H&S management of construction sites. The model was based on 3P + I, namely policy, process, personnel and incentive factors. These core factors were measured by 590 attributes. The large number of attributes might not be practical in the context of SMEs. Fernandez-Muniz *et al.,* (2007) developed a positive H&S culture model that consisted of management commitment, employee involvement and H&S management system (SMS). The SMS included H&S policy, incentives, training, communication, planning and control. The model could be applied to more than one type of industry of different sizes. Chinda and Mohamed, (2008) developed H&S culture model adapted from the European Foundation Quality Model (EFQM). The enablers that were identified were leadership, policy and strategy, partnerships and resources, and processes and H&S outcome or goals. The model was validated using large contractors in Thailand. It might be possible to test this model or a modified model within SMEs. Molenaar *et al.,* (2009) established that for H&S performance to improve that is reduction of accidents. The corporate H&S culture should comprise of: H&S commitment, H&S incentives, subcontractor involvement, H&S accountability and disincentives.

The models of H&S reviewed did not have similar H&S practices. Hence, this suggests a need to determine the H&S practices for construction SMEs in South Africa. Further, the studies did not include demographic variables in their study as predictors of H&S practices. Hinze (1997) opined that demographic attributes can influence safety climate and further influence employee safety behaviour. Therefore, this is a major gap in this study.

Demographic relationship with H&S practices

According to Vinodkumar and Bhasi, (2009) H&S practices perception has been found to vary among different groups in organisations. They established that the perception of H&S practices namely management commitment and actions for safety, workers' knowledge and compliance to safety, workers participation and commitment to safety, priority for safety over production, emergency preparedness and workers attitude towards safety, differed significantly based on the employees qualification level. They further established that employees perception based on age differed significantly on different H&S practices namely management commitment and actions for safety, workers' knowledge and compliance to safety, workers participation and commitment to safety and risk justification. Finally, based on the years of experience, the employees' perception differed significantly on management commitment and actions for safety, workers' knowledge and compliance to safety, workers participation and commitment to safety and risk justification. Agumba et al., (2014) found that SMEs employees with post-matric qualification strongly agreed that upper management are committed and involved in H&S. According to Cheng, et al., (2012) age significantly relate to safety management practices (SMP) i.e. safety management information, safety management process and safety management committees. The study established that the older the respondents, the higher they rated the importance level of the SMP variables. Furthermore, the study established that years of experience in current position, type of the firm, gender and size of the firm were not significantly related to SMP. In a separate study, Azimah et al., (2009) established no significant difference on workers perception on the H&S practices i.e. safety reporting, safety satisfaction and feedback, training and competence and management commitment between male and female. However, there was significant difference on safety involvement.

These studies did not statistically establish the causality or influence of demographic attributes on the H&S practices. Hence, demographic data were collected to determine their influence on the H&S practices implementation at project level of construction SMEs in South Africa.

PROBLEM STATEMENT

It is evident from previous research that no consensus has been reached on the required H&S practices in there models. Moreover, demographic attributes influence or causality on H&S practices has been scantily researched especially within the construction industry SMEs in South Africa, which has a high injury rate among its workers.

The specific objectives of the study are:

- To determine the reliability and validity of the determined H&S practices; and
- To investigate the influence or causality of SMEs demographic attributes on the H&S practices.

RESEARCH METHODS

The research philosophy used for this study was pragmatic i.e. involving mixed method approach. It used a Delphi survey for H&S experts and a questionnaire survey for the contractors. Delphi method straddles between qualitative and quantitative research methods. A questionnaire survey was developed from relevant literature and four rounds of Delphi survey were undertaken. Twenty H&S experts were purposively sampled of which 16 experts finished all the four rounds of Delphi. The Delphi study process is not reported here. The H&S experts indicated that 31 H&S measures/practices were very important and considered to have major impact to improve H&S performance at SMEs project level. These H&S practices comprised the final questionnaire presented to the SMEs in the South African construction industry. The 31 practices addressed five H&S core practice areas. The respondents were required to indicate their level of agreement with the practices. The statements were rated on a five point Likert scale, where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree. Other parts of the questionnaire were designed to profile the participants' demographic attributes and their organisation.

The questionnaire was piloted with eight SMEs upper management personnel and those knowledgeable of H&S practices at their project level. The final version was presented to 1,450 conveniently sampled SMEs. The data was collected using email and drop and collect method of which 228 questionnaires were returned representing 15.72% response rate. This low response rate concurs with findings of Kongtip *et al.*, (2008). However, 216 questionnaires were deemed eligible for analysis. The statistical package for social science (SPSS) version 20 was used to conduct descriptive statistical analysis of the data computing the frequencies, mean scores and standard deviation. The SPSS was further used to determine the factor analysability of the H&S practices. Similarly, exploratory factor analysis (EFA) was used to determine the unidimensionality and reliability of the H&S practices. Reliability was tested using Cronbach alpha with a cut-off value of 0.70 recommended by Hair *et al.*, (2006).

Confirmatory factor analysis determined the acceptability of the H&S constructs. The acceptability of the H&S constructs were determined using Confirmatory Factor Analysis (CFI), Tucker Lewis Index (TLI) which should be greater than 0.90; Root mean square error of approximation (RMSEA) and Standardized root mean squared residuals (SRMR) less than 0.08; p-value less than 0.05 and normed chi-squared (x^2/df) less than 5. Finally, multiple linear regression were carried out on a selected number of demographic variables namely; experience in the construction industry, education level and number of employees in the organization on their influence on H&S practices.

RESULTS AND DISCUSSIONS

Descriptive statistics on demographics

The result found that 28% of the respondents had matric and 58% of respondents had post-secondary school qualification. 32% had 6-10 years of experience in the construction industry and only 4% of respondents had over 36 years of construction industry experience. The result also indicates that 19% of the respondents had less than 6 years of construction experience. The results further indicated that 84% of the respondents had less than 50 permanently employed employees in there companies, of which 56% employed less than 20 permanent employees.

EFA for upper management involvement and commitment in H&S

The result in Table 1 indicates Cronbach alpha of upper management and involvement was greater than 0.70 at 0.868, indicating acceptable internal reliability as recommended by Hair *et al.*, (2006). The Kaiser-Meyer-Olkin (KMO) of 0.890 with Bartlett's Test of Sphericity of $p<0.000$ were also obtained. Indicating consistency with the recommended KMO cut off value of 0.60 and Bartlett's Test of Sphericity of $p<0.05$ as suggested by Pallant, (2007). These results suggest that factor analysis could be conducted with the data. All the eleven practices expected to measure upper management commitment and involvement in H&S loaded together on this factor. The factor loadings for all practices were greater than 0.452, which were greater than the recommended value of 0.40 as suggested by Field (2005) and Hair *et al.*, (2006). An Eigenvalue greater than 5.107 were established which explained 46.427% of the variance in the data. Therefore, sufficient evidence of convergent validity was provided for this construct. This finding was in line with the study of Fernandez-Muniz *et al.*, (2007) and Findley *et al.*, (2004).

Table 1 Upper management commitment and involvement in H&S

Eigen value 5.107	% of variance 46.427	Cronbach alpha 0.868	
Practice	Cronbach alpha	Factor loading	Rank
I/We communicate regularly with workers about H&S	0.847	0.786	1
I/We actively monitor the H&S performance of the projects and workers.	0.844	0.778	2
I/We encourage discussions on H&S with employees	0.849	0.728	3
I/We regularly visit workplaces to check work conditions or communicate with workers about H&S	0.850	0.717	4
I/We actively and visibly lead in H&S matters by e.g. walk through the site	0.855	0.672	5
I/We take responsibility for H&S by e.g. stopping dangerous work on site etc.	0.854	0.667	6
I/We ensure that the H&S equipment is bought e.g. hardhats, overall etc.	0.857	0.618	7
I/We conduct toolbox talks with the workers regularly	0.857	0.604	8
I/We accord workers H&S training when there is less work in the project.	0.865	0.491	9
I/We reward workers who make extra effort to do work in a safe manner.	0.873	0.465	10
I/We encourage and support worker participation, commitment and involvement in H&S activities.	0.867	0.452	11

EFA for employee involvement and empowerment in H&S

Table 2 indicate that the Cronbach alpha was greater than 0.70 at 0.842 indicating acceptable internal reliability as recommended by Hair *et al.*, (2006). The Kaiser-Meyer-Olkin (KMO) of 0.819 with Bartlett's Test of Sphericity of $p<0.000$ were also obtained. Indicating consistency with the recommended KMO cut off value of 0.60 and Bartlett's Test of Sphericity of $p<0.05$ as suggested by Pallant, (2007). These results suggest that factor analysis could be conducted with the data. The factor loadings for all items were greater than 0.458 reported in Table 2, which were greater than the recommended value of 0.40 as suggested by Field (2005) and Hair *et al.*, (2006). An Eigenvalue greater than 3.079 was established in this factor which explained 61.557% of the variance in the data. Therefore, sufficient evidence of convergent validity was provided for this construct. This finding concurs with the study of Fernandez-Muniz *et al.*, (2007) and Agumba *et al.*, (2008).

Table 2 Employee involvement and empowerment in H&S

Eigen value 3.079	% of variance 61.577	Cronbach alpha 0.842		
Practice		Cronbach alpha	Factor loading	Rank
Our workers are involved in the production of H&S policy		0.778	0.863	1
Our workers help in developing of H&S rules and safe work procedures.		0.776	0.839	2
Our workers are consulted when the H&S plan is compiled		0.791	0.814	3
Our workers are involved in H&S inspections.		0.832	0.598	4
Our workers can refuse to work in potentially unsafe, unhealthy conditions		0.857	0.458	5

EFA for project H&S planning and communication

The result in Table 3 indicates that the Cronbach alpha was greater than 0.70 at 0.852 indicating acceptable internal reliability as indicated by Hair *et al.*, (2006). The Kaiser-Meyer-Olkin (KMO) of 0.764 with Bartlett's Test of Sphericity of $p<0.000$ were obtained. Indicating consistency with the recommended KMO cut off value of 0.60 and Bartlett's Test of Sphericity of $p<0.05$ as suggested by Pallant, (2007). These results suggest that factor analysis could be conducted with the data. The factor loadings for all the four items were greater than 0.665 reported in Table 3, which were greater than the recommended value of 0.40 as suggested by Field (2005) and Hair *et al.*, (2006). An Eigenvalue greater than 2.786 was established in this factor which explained 69.644% of the variance in the data. Therefore, sufficient evidence of convergent validity was provided for this construct.

Table 3 Project health and safety planning and communication

Eigen value 2.786	% of variance 69.644	Cronbach alpha 0.852		
Item/practice		Cronbach alpha	Factor loading	Rank
Our firm uses procedures to identify possible H&S dangers on site		0.788	0.833	1
I/We include H&S in our projects program		0.784	0.822	2
I/We consider H&S when layout of site is done		0.823	0.769	3
I/We organize regular meetings to verbally inform workers about the risk and preventive measures of their work.		0.850	0.665	4

EFA for project supervision

The result in Table 4 indicates that the Cronbach alpha was greater than 0.70 at 0.868 indicating acceptable internal reliability (Hair *et al.*, 2006). The Kaiser-Meyer-Olkin (KMO) of 0.868 with Bartlett's Test of Sphericity of $p<0.000$ were also obtained, indicating consistency with the recommended KMO cut off value of 0.60 and Bartlett's Test of Sphericity of $p<0.05$ as suggested by Pallant, (2007). These results suggest that factor analysis could be conducted with the data. All six items expected to measure the factor project supervision loaded together on this factor. The factor loadings for all items were greater than 0.666 reported in Table 4, which was greater than the recommended value of 0.40 as suggested by Field (2005) and Hair *et al.*, (2006). An Eigenvalue greater than 3.640 was established in this factor which explained 60.662% of the variance in the data. Therefore, sufficient evidence of convergent validity was provided for this construct. This finding was in line with the study of Fernandez-Muniz *et al.*, (2007).

Table 4 Project supervision

Eigen value 3.640	% of variance 60.662	Cronbach alpha 0.868		
Practice		Cronbach alpha	Loading factor	Rank
I/we allow supervision of work by staff trained in H&S.		0.837	0.786	1
I/we undertake informal H&S inspection of the work place daily.		0.837	0.781	2
One of our employees trained in H&S identifies dangerous activities.		0.848	0.718	3
I/we undertake formal H&S inspection of the work place daily.		0.850	0.714	4
I/We allow local authorities and H&S enforcement agencies to visit site for inspection.		0.850	0.693	5
I/we regularly undertake H&S audits of projects		0.854	0.666	6

EFA for H&S resources and training

The result in Table 5 indicates that the Cronbach alpha was greater than 0.70 at 0.864 indicating acceptable internal reliability as suggested by Hair *et al.*, (2006). The Kaiser-Meyer-Olkin (KMO) of 0.801 with Bartlett's Test of Sphericity of $p<0.000$ were also obtained. Indicating consistency with the recommended KMO cut off value of 0.60 and Bartlett's Test of

Sphericity of $p<0.05$ recommended by Pallant, (2007). These results suggest that factor analysis could be conducted with the data. All five items expected to measure H&S resources and training loaded together on this factor. The factor loadings for all items were greater than 0.708 reported in Table 5, which were greater than the recommended value of 0.40 as suggested by Field (2005) and Hair *et al.*, (2006). An Eigenvalue greater than 3.281 was established in this factor which explained 65.628% of the variance in the data. Therefore, sufficient evidence of convergent validity was provided for this construct. This finding was supported by Choudhry *et al.*, (2007) and Agumba *et al.*, (2008).

Table 5 H&S resources and training

Eigen value 3.281	% of variance 65.628	Cronbach alpha 0.864		
Item/practice		Cronbach alpha	Factor loading	Rank
I/we provide correct tools, equipment to execute construction work.		0.832	0.782	1
I/we ensure that workers are trained to do the work safely		0.830	0.771	2
I/We ensure our workers are properly trained to take care and use personal protective equipment		0.834	0.763	3
I/we conduct induction of all workers on H&S before commencing work on a particular site		0.835	0.751	4
I/We buy hardhats, gloves, overall etc. for workers		0.847	0.708	5

Confirmatory factor analysis

The results in Table 6 indicate that the H&S constructs were acceptable measures of H&S practice at project level of SMEs. However, four of the five constructs tested were not fitting in some of the proposed indices and they were re-specified. The re-specified H&S practices were management commitment & involvement, project supervision, project H&S planning and communication, H&S resources and training. It should be noted that majority of the H&S constructs *p*-value were not acceptable. This was because of the large number of data analysed which tends to produce significant results. It has therefore been argued that *p*-value cannot be used as a solitary measure to determine the acceptability fit of constructs.

The fit indices for management commitment and involvement were fitting after the re-specification of the construct, apart from the *p*-value. The *p*-value indicated significant result greater than 0.05. The normed chi-square was less than 5 that is 1.37 indicating good fitting construct. The CFI and TLI were greater than 0.90 indicating a good fit construct. The RMSEA and SRMR shows values of 0.041 and 0.043 respectively indicating the construct had a good fit. This result concurs with the finding of Fernandez-Muniz *et al.*, (2007).

The fit indices for employee involvement and empowerment were fitting, apart from the *p*-value. The *p*-value indicated significant result greater than 0.05. Furthermore this construct was not re-specified. The normed chi-square was less than 5 that is 1.80 indicating good fitting construct.

The CFI and TLI were greater than 0.90 indicating a good fit construct. The RMSEA and SRMR shows values of 0.061 and 0.033 respectively indicating the construct had a good fit. This result concurs with the finding of Fernandez-Muniz *et al.*, (2007).

The fit indices for project supervision and project H&S planning and communication were fitting after the re-specification of the construct, apart from the *p*-value. The *p*-value indicated significant result greater than 0.05. The normed chi-square was less than 5 indicating good fitting construct. The CFI and TLI were greater than 0.90 indicating a good fit construct. The RMSEA and SRMR indicated the construct had a good fit as the values were less than 0.08.

The fit indices for H&S resources and training were fitting after the re-specification of the construct, apart from the TLI. The *p*-value indicated non-significant result less than 0.05. The normed chi-square was less than 5 indicating good fitting construct. The CFI was greater than 0.90, whereas TLI was less than 0.088 indicating a weak fit. The RMSEA indicated a close fit with a value of 0.088 and SRMR indicated a good fit with a value of less than 0.08.

Table 6 Confirmatory factor analysis

Construct	No. of Items	x^2	D	x^2/df	p-value	RMSEA	CFI	TLI	SRMR
Management commitment & involvement	11	58.98	4	1.37	0.053	0.041	0.96	0.95	0.043
Employee involvement & empowermen	5	9.00	5	1.80	0.1091	0.061	0.98	0.96	0.033
Project supervision	4	12.50	8	1.56	0.1300	0.051	0.98	0.96	0.033
Project H&S planning & communication	6	2.227	1	2.22	0.1356	0.075	0.99	0.96	0.011
H&S resources & training	5	10.69	4	2.68	0.0302	0.088	0.94	0.85	0.040

RESULTS OF MULTIPLE LINEAR REGRESSION (MLR) ANALYSIS

Multiple Linear Regression analysis was carried out to determine if the selected demographic attributes i.e. experience in the construction industry, education level and number of employees in the organization had significant influence on the valid and reliable H&S practices. Different null hypotheses were postulated;

H°1 There is no relationship between the demographic variables and the perceived upper management commitment and involvement in H&S.

The result in Table 7 indicates, the demographic variables explained 3.90% of the variance in the upper management commitment and involvement in H&S at project level of SMEs. This suggests that the demographic variables were not good predicators of upper management commitment and involvement in H&S because of the low R^2 value achieved as indicated in Table 7. The results also illustrated significant negative

linear relationship (-2.45; $p< 0.05$) between the education level and upper management commitment and involvement in H&S. However, the result further indicated that the model tested was not significant as the significance level was slightly greater than 0.05 at 0.059. Therefore, the finding that education level predicts upper management commitment and involvement in H&S was therefore not supported.

Table 7 Demographics influence on management commitment & involvement

Dependent variable: Upper management commitment and involvement in H&S R-square = 0.039				Model Sig.(p)
Independent variables (demographics)	SC. Beta	t-value	Sig.(p)	0.059
Constant		27.67	0.000	
Experience in the construction industry	0.018	0.255	0.799	
Education level	-0.177	-2.447	0.015	
Number of employees	-0.093	-1.292	0.198	

H°2 There is no relationship between the demographic variables and the perceived worker involvement and empowerment in H&S.

As indicated in Table 8, the demographic variables explained 1.20% of the variance in the workers involvement and empowerment in H&S at project level of SMEs. This suggests that the independent variables were not good predicators of worker involvement and empowerment in H&S, because of the low R^2 value achieved as indicated in Table 8. The results further indicated no significant linear relationship that emerged between the independent variable and worker involvement and empowerment in H&S. In other words, the respondents, years' of experience in the construction industry, the education level and number of employees in the organization, have no significant influence on whether workers are involved and empowered in H&S within SMEs. Furthermore, the result indicated that the model was not significant as it was greater than 0.05, significance level at 0.478.

Table 8 Demographics influence on worker involvement & empowerment

Dependent variable: Worker involvement and empowerment in H&S R-square = 0.012				Model Sig.(p)
Independent variables (demographics)	SC. Beta	t-value	Sig.(p)	0.478
Constant		15.344	0.000	
Experience in the construction industry	0.077	1.089	0.277	
Education level	0.026	0.372	0.710	
Number of employees	-0.071	-1.002	0.317	

H°3 There is no relationship between the demographic variables and the perceived project H&S planning and communication.

Table 9 indicates that, the demographic variables explained 2.20% of the variance in the project H&S planning and communication at project level of SMEs. This suggests that the independent variables were not good predicators of project H&S planning and communication because of the low R^2 value achieved as indicated in Table 9. The results further indicated no significant linear relationships that emerged between the independent variables and project H&S planning and communication. In other words, the respondents, years' of experience in the construction industry, the education level and number of employees in the organization, have no significant influence on whether project H&S planning and communication is practiced within SMEs. Furthermore, the result indicated that the model was not significant as the model significance level was greater than 0.05 at 0.219.

Table 9 Demographics influence on project H&S planning and communication

Dependent variable: Project H&S planning and communication R-square = 0.022				Model Sig.(p)
Independent variables (demographics)	SC. Beta	t-value	Sig.(p)	0.219
Constant		20.623	0.000	
Experience in the construction industry	0.094	-1.333	0.184	
Education level	-0.098	-1.399	0.163	
Number of employees	-0.081	-1.155	0.249	

H°4 There is no relationship between the demographic variables and the perceived project supervision.

According to Table 10, the demographic variables explained 0.5% of the variance in the project supervision project level of SMEs. This suggests that the independent variables were not good predicators of project supervision because of the low R^2 value achieved as indicated in Table 10. The results further indicated no significant linear relationships that emerged between the independent variable and project supervision in other words, the respondents, years' of experience in the construction industry, the education level and number of employees in the organization, have no significant influence on whether project supervision is practiced within SMEs projects. Furthermore, the result indicated that the model was not significant as the significance level was greater than 0.05 at 0.792.

Table 10 Demographics influence on project supervision

Dependent variable: Project supervision R-square = 0.005				Model Sig.(p
Independent variables (demographics)	SC. Beta	t-value	Sig.(p)	0.792
Constant		19.646	0.000	
Experience in the construction industry	0.066	-0.928	0.355	
Education level	-0.021	-0.287	0.774	
Number of employees	-0.031	-0.436	0.664	

H°5 There is no relationship between the demographic variables and the perceived H&S resources and training.

According to Table 11, the demographic variables explained 2.90% of the variance in the H&S resources and training at project level of SMEs. This suggests that the independent variables are not good predicators of H&S resources and training because of the low R^2 value achieved as indicated in Table 11. The results also indicated a negative linear relationship (-2.26; $p<0.05$) between the education level and H&S resources and training. However, a further result indicated that the model was not significant as the significance level was greater than 0.05 at 0.106. Therefore, the finding that education level predicts H&S resources and training was therefore not supported.

Table 11 Demographic influence on H&S resources and training

Dependent variable: H&S resources and training R-square = 0.029				Model Sig.(*p*)
Independent variables (demographics)	SC. Beta	t-value	Sig.(*p*)	0.106
Constant		26.328	0.000	
Experience in the construction industry	-0.059	-0.845	0.399	
Education level	-0.156	-2.258	0.025	
Number of employees	-0.067	-0.973	0.332	

CONCLUSION

The H&S practices were valid and reliable and if used will inform South Africa construction SMEs of their H&S performance and reflect their H&S culture at project level. However, the demographic attributes namely; experience in the construction industry, education level and number of employees in the organization were poor predicators of the H&S practices. This study informs the construction SMEs that the suggested demographic variables should not be relied as predictors of H&S practices being implemented. The researchers, further recommends further study on other demographic variables of the respondents apart from those tested in this study.

CONTRIBUTION OF THE STUDY

The managerial contributions from this study are that this H&S practices can be used by South African construction SMEs at project level. However, the years of experience, the number of employees in the organization and educational level do not suggest that H&S practices will be used in the construction SMEs organisation.

REFERENCES

Abudayyeh, O., Fredericks K.T., Butt, E.S. and Shaar, A. (2006). An investigation of management's commitment to construction safety. *International Journal of Project Management*, 24(2), 167-174.

Agumba, J.N. and Haupt, T. (2008). Perceptions of construction health and safety performance improvement enablers, *Proceeding of Association of Schools of Construction of Southern Africa (ASOCSA) 3rd Built Environment Conference*, Westin Grand, Cape Town, South Africa, 6th–8th July, pp. 184-200.

Agumba, J.N. and Haupt, C.T. (2014). Perception of health and safety practices at project level of small and medium construction enterprises: Does personnel attributes matter? *Journal of Engineering Design and Technology*, 12(4), 530-550.

Aksorn, T. and Hadisukumo, B.H.W. (2008). Critical success factors influencing safety performance program in Thai construction projects. *Safety Science*, 46(4), 707-727.

Azimah, N. Abdullah C. Spickett T.J. Rumchev, B.K. and Dhaliwal S.S. (2009). Assessing employees' perception on health and safety management in public hospitals. *International Review of Research* papers, 5(4), 54-72.

Cheng W.L.E. Ryan, N. and Kelly, S. (2012). Exploring the perceived influence of safety management practices on project performance in the construction industry. *Safety Science*, 50(2,), 363-369.

Chinda, T. and Mohamed, S. (2008). Structural equation model of construction safety culture. *Engineering, Construction and Architectural Management*, 15(2), 114-131.

Choudhry, M.R., Fang, D., Lew, J.J. and Jenkins, L.J. (2007). Assessing safety climate in construction, A case study in Hong Kong, Proceedings of *Associated Schools of Construction (ASC), 43rd Annual Conference,* Northern Arizona University, Flagstaff, Arizona, USA, April 11th-14th.

Construction Industry Development Board (2004). SA Construction Industry Status Report, Pretoria, South Africa.

Construction Industry Development Board (2008). Construction Health and Safety in South Africa, Status and Recommendations. Pretoria, South Africa.

Department of Labour (2012). SA labour view on construction HS data, Retrieved from http://sheqafrica.com/construction-health-safety-stats/ on the 2/06/2014.

Department of Public Works (1999). White paper on Creating an Enabling Environment for Reconstruction Growth and Development in the Construction Industry, Government Printers, Republic of South Africa,

Retrieved from http://www.info.gov.za/whitepaper/1999/environment.htm on the 20/05/2014.

Fernandez-Muniz, B., Montes-Peon M.J. and Vazquez-Ordas, J.C. (2007). Safety culture: Analysis of the causal relationships between its key dimensions. *Journal of Safety Research*, 38(6), 627-641.

Field, A. (2005). *Discovering Statistics Using SPSS (and Sex, Drugs and Rock 'N 'Roll)*. 2nd Edition. London: Sage.

Findley, M., Smith, S., Tyler K., Petty G. and Enoch K. (2004). Injury and cost control safety program elements in construction. Which ones best prevent injuries and control related workers' compensation costs? *Professional Safety*, 49(2), 14-21.

Hair, J.F., Black, W.C., Babin, J.B., Anderson, R.E. and Tatham, R.L. (2006). *Multivariate data analysis*, 6th Edition. Upper Saddle River, New Jersey: Pearson/Prentice Hall.

Hinze, J.W. (1997). Construction Safety. Prentice-hall, Inc., Upper Saddle River, New Jersey.

Kongtip, P., Yoosook, P. and Chantanakul, S. (2008). Occupational health and safety management in small and medium-sized enterprises: An overview of the situation in Thailand, *Safety Science*, 46(9), 1356-1368.

Martin, l. (2010). Challenges faced by South African emerging contractors- review and update. *Proceedings of the Construction, Building and Real Estate Research conference of Royal Institute of Chartered Surveyors*, Dauphine Universite, Paris 2nd-3rd September, France.

Molenaar, R.K., Park, J-II. and Washington, S. (2009). Framework for measuring corporate safety culture and its impact on construction safety performance, *Journal of Construction Engineering and Management*, 135(6), 488-496.

Ng, T.S., Cheng, P.K. and Skitmore, R.M. (2005). A framework for evaluating the safety performance of construction contractors, *Built and Environment*, 40(10), 1347-1355.

Pallant, J. (2007). *SPSS, Survival Manual: A Step-by-Step Guide to Data Analysis Using SPSS Version 15*, 3rd Edition, McGraw Hill.

Sawacha, E., Naoum, S. and Fong, D. (1999). Factors affecting safety performance on construction sites. *International Journal of Project Management*, 17(5), 309-315.

Smallwood, J. and Haupt, T. (2005). The need for construction health and safety (H&S) and the Construction Regulations: Engineers' perceptions". *Journal of the South African Institution of Civil Engineering*, 47(2), 2-8.

Teo, A. L. E., and Ling Y.Y.F. (2006). Developing a model to measure the effectiveness of safety management systems of construction sites. *Built and Environment*, 41(11), 1584-1592.

Teo, A.L.E., Theo, H., and Feng, Y. (2008). Construction health and safety performance in developing and developed countries: A parallel study in South Africa and Singapore. In Hinze, S Bohmer and J Lew (Eds), *Proceedings of the CIB W99 14th International Conference on Evolution of and Directions in Construction Health and Safety,* Gainesville, Florida 9th-11th March, USA, pp. 485-499.

Vinodkumar, N.M. and Bhasi, M. (2009). Safety climate factors and its relationship with accidents and personnel attributes in the chemical industry. *Safety Science,* 47(5), 659-667.