

Chapter 8: A survey to analyse the outcomes of women construction entrepreneurs

8.1 Introduction

The aim of this chapter is:

- To apply the Logical thinking approach of evaluation, specifically the Outcomes aspect's 'Acceptability' element, to women construction entrepreneurs; by
- performing an opinion survey of contract and business opportunity providers, service providers and public sector officials regarding the acceptability of the skills and outcome qualities of SMME construction entrepreneurs, both male and female.
- To develop an instrument to measure the above based on the evaluation constructs developed from the literature and the 13 SMME construction entrepreneurship constructs developed for the purpose of this study.

8.2 Research design and methodology for this chapter

8.2.1 Statistical methodology

The questionnaire was circulated amongst delegates who qualified for the four groups (See Section 8.2.5) at SAWiC meetings. For the purpose of this study, it is classified as a designated study of SAWiC delegate universum. It can also be regarded as a sample (although not a random sample) of the construction sector. As this is not a random sample survey, the sampling tests were therefore not done. According to Baker (2000:4) Quasi-experimental (non-random) methods can be used to carry out an evaluation when it is not possible to construct treatment and comparison groups through experimental design. Four versions of the questionnaire were developed and pilot tested before the final one was used. After the questionnaire was filled out a short interview was held with each respondent. This provided some qualitative information and ensured that all the questions were answered.

8.2.2 Managerial question (What is this questionnaire all about?)

The managerial question is: Do the providers of construction business opportunities and services in the different sectors accept the skills and outcomes of men and women construction entrepreneurs?

8.2.3 Respondents targeted (Who filled out the questionnaire?)

This questionnaire was directed to government officials, development finance institution's staff, main contractors, service providers and employers in the public and private sector who are responsible for decision-making regarding the appointment of contractors or sub-contractors, for awarding public or private sector projects and tenders, and for the allocation of any construction related business opportunities to SMME entrepreneurs.

8.2.4 Responses used (How many?)

A total number of 71 questionnaires were distributed amongst the targeted populations. Only 62 could finally be used. After the questionnaire was filled out, the author checked whether the respondent filled in all the questions, before the respondent left. The 9 questionnaires that could not be used were taken home by the respondents and sent back by mail, but had too many open spaces to be used.

8.2.5 Respondents per sector (Where are the respondents coming from?)

The 62 respondents who gave their opinions can be divided into the following sectors:

- S1. Contract providers and officials of the Department of Public Works (DPW) responsible for adjudicating business opportunities, mainly in the form of tenders, to SMMEs in the construction sector. = 18 respondents.
 - S2. Local government staff, including councillors sitting on boards, responsible for handling feedback from clients regarding the quality of work, level skills and outcomes of SMMEs in the construction sector. = 11 respondents.
 - S3. NGOs, Financial and Training institutions providing services to both male and female entrepreneurs in the construction sector. = 12 respondents.
 - S4. Contract-providers at private sector construction companies responsible for allocating business opportunities in the form of sub-contracts to SMMEs in the construction sector. = 21 respondents.
- Total all sectors n = 62 respondents.

Originally the sector classification included only the public sector and the private sector, but when the filled out questionnaires were considered for sector classification it was realised that the above four classifications will be more suitable. E.g. the training institutions and the financial banks are both private and public sector, and they work on a service provider level with the entrepreneurs, while the local

authorities, councillors and building inspectors deal more with complaints and feedback from clients on the construction work of the male and female construction entrepreneurs.

8.2.6 Respondents per gender (Of which gender are the respondents?)

The 62 respondents who gave their opinions can be divided into

Male = 23;

Female = 39

8.2.7 Development of questions in questionnaire

The questionnaire consists of 69 questions that were extracted and developed from the following construction industry sources and references:

- Association of SA Quantity Surveyors (ASAQS), Model Bill for Small or Simple Buildings (first edition); <http://www.asaqs.co.za> (ASAQS, 2001). Their model bill comprise of the elements involved in trades, building and construction.
- Building Industries Federation South Africa (BIFSA) State of the Civil Industry. <http://www.bifsa.org.za> (BIFSA, 2002). This source provides a comprehensive analysis of the important issues of the construction sector in relation to the economy.
- Construction Education and Training Authority (CETA) <http://www.ceta.org.za> (CETA, 2002). This source gave a comprehensive overview of the different learner-ships in building and construction.
- South African Women in Construction (SAWiC) Membership Database. <http://www.dbsa.org/Sawic> (Verwey 2002). This database of over 600 members gave an indication of the construction actual activities of women construction entrepreneurs.

8.2.8 Example of the outlay of the questionnaire

On a scale of 1 to 4, how would you rate the issues regarding Female and Male construction entrepreneurs? (Women in Construction vs. Men in Construction)

Please encircle your choice:

1= Bad & not acceptable; 2=Needs improvement; 3=Good; 4=Excellent

	Entrepreneurs: or Contractors:				Female Women				Male Men			
1. Education, training and skills background	1	2	3	4	1	2	3	4	1	2	3	4

8.3 Statistical tools used for the confirmation of validity and reliability

8.3.1 Cronbach Alpha analysis on deleted results of each question

Cronbach's Alpha is regarded as one of the most important reliability estimates. It measures internal consistency and the degree to which instrument items are homogeneous and reflect the same underlying construct(s) (Cooper & Schindler 2001:216-217). A Cronbach Alpha value of above 0.5 is regarded as an indication of reliability. From the 69 questions the 13 constructs in Table 8.1 were derived to measure the contract providers' acceptance of the skill and outcome levels of both women and men construction entrepreneurs. Should one question be deleted from the group, the Cronbach Alpha values in Table 8.1 present the value that the rest of the questions in the group will accept.

Table 8.1 Questions from which the Constructs were developed and Cronbach Alpha deleted results of the individual questions

	Female	Male
Construct 1. Understanding plans, drawings, site layouts and levels		
Understanding site plans and drawings	0.895	0.948
Levelling and site readiness	0.889	0.947
Layout of buildings on site	0.876	0.944
Understanding architect plans	0.858	0.940
Foundations and engineering knowledge	0.875	0.946
Construct 2. Brickwork, bricklaying, plastering and 'wet-work'		
Brickwork skills	0.874	0.947
Bricklaying skills	0.867	0.951
Plastering skills	0.866	0.957
Walling	0.851	0.948
Cement flooring and finishing skills	0.904	0.951
Construct 3. General carpentry, doors, ceiling and roofing		
General carpentry skills	0.883	0.950
Hanging of doors, cupboards	0.888	0.951
Roof timbering	0.869	0.939
Ceilings	0.874	0.936
Roof covering	0.910	0.958
Construct 4. Plumbing, Drainage and piping		
Plumbing skills	0.899	0.961
Drainage	0.892	0.968
Fitting bathrooms	0.911	0.954
Water piping	0.916	0.960
Construct 5. Electricity, tubing, wiring and lighting		
Electricity and lighting	0.921	0.957
Electric tubing	0.903	0.956
Electric wiring	0.913	0.949
Hot water geyser installations	0.943	0.977
Construct 6. Wall tiling, glazing, painting and floor tiling		
Wall Tiling	0.901	0.956
Windows and glazing	0.926	0.950

	Painting skills	0.906	0.945
	Carpets and floor-tiling	0.910	0.937
Construct 7. Paving, road works, curbing and gabion			
	Paving skills	0.928	0.962
	Curbing and sidewalks	0.890	0.954
	Road works	0.903	0.951
	Storm water and culverts	0.890	0.950
	Gabions and retaining of roadsides	0.920	0.961
Construct 8. Road maintenance, cleaning and grass cutting			
	Road maintenance	0.847	0.908
	Grass cutting along sides of roads	0.801	0.890
	Cleaning of paved areas	0.803	0.902
	Fencing and gates	0.865	0.908
Construct 9. Traditional African building, thatching, painting and flooring			
	Traditional African building skills	0.900	0.886
	Traditional thatching skills	0.913	0.882
	Traditional painting of walls	0.902	0.888
	Traditional flooring skills	0.892	0.880
	Erection of traditional tourist attractions	0.922	0.884
Construct 10. General Education, language and terminology			
	Language proficiency	0.928	0.935
	Tender documentation concepts	0.922	0.929
	Understanding technical terminology	0.924	0.927
	Understanding procedures	0.919	0.929
	Empowerment language and legislation	0.915	0.929
	Procurement language procedures	0.918	0.927
	Awareness of health, safety and HIV	0.929	0.943
	Awareness of environmental sustainable development	0.923	0.937
Construct 11. General managerial, finance and business			
	Financial management	0.915	0.947
	Project management	0.921	0.934
	Personnel and resource management	0.933	0.931
	Turnover and cash flow projections	0.914	0.924
	Bridging finance and guarantees	0.932	0.932
Construct 12. Future directed, innovation, creativity, business planning			
	Business plans	0.886	0.880
	Creativity and innovation	0.860	0.897
	Competitive edging	0.849	0.868
	Culture and climate of business entity	0.839	0.867
	Compliance regarding time frames & deadlines	0.877	0.890
Construct 13. Tender, pricing, legal, tax and procurement			
	Managing tender documentation	0.951	0.963
	Understanding procurement documentation	0.951	0.962
	Tendering and Pricing	0.953	0.962
	Interpreting prescriptions of contract providers	0.952	0.963
	Understanding evaluation theory and practice	0.952	0.962
	Legal requirements on enterprise status	0.951	0.963
	Tax clearance documentation	0.953	0.965
	Delegated authority to sign	0.952	0.965
	Providing track-record, skill profiles & résumés	0.950	0.964
	Providing information on marketing	0.951	0.965

8.3.2 Cronbach Alpha analysis of the constructs

The Cronbach Alpha results of all the constructs are far above the 0.5 level that is required for reliability. The Cronbach Alpha results of each group of questions are in some cases higher than the individual deleted values of Table 8.1, which means that all the questions within each group are valid and reliable and is forming valid and reliable constructs. The constructs are thus measuring what they are supposing to measure, indicating a good and reliable instrument.

Table 8.2 Cronbach Alpha results of the constructs

Construct No	Constructs developed: 69 questions (F= Female; M= Male) Acceptability of SMMEs on skills and outcomes regarding:	Gender	Cronbach Alpha values
C1	Understanding plans, drawings, layouts & levels	Female Male	0.901 0.956
C2	Brickwork, bricklaying, plastering and 'wet-work'	Female Male	0.896 0.960
C3	General carpentry, doors, ceiling and roofing	Female Male	0.906 0.957
C4	Plumbing, drainage and piping	Female Male	0.927 0.970
C5	Electricity, tubing, wiring and lighting	Female Male	0.940 0.969
C6	Wall tiling, glazing, painting and floor tiling	Female Male	0.932 0.960
C7	Paving, road works, curbing and gabion	Female Male	0.924 0.964
C8	Road maintenance, cleaning & grass cutting	Female Male	0.867 0.925
C9	Traditional African building, thatching, painting & flooring	Female Male	0.923 0.905
C10	General Education, language and terminology	Female Male	0.931 0.940
C11	General managerial, finance and business	Female Male	0.938 0.944
C12	Future directed, creativity innovation, business plans	Female Male	0.887 0.902
C13	Tender, pricing, legal, tax and procurement	Female Male	0.956 0.967

Some of the constructs above were combined in an attempt to reduce the total

8.3.3. Factor analysis on the constructs

Established statistical tools such as Factor Analysis help determine the construct adequacy of a measuring instrument. Factors may be considered non-metric

factor as described in Construct 13.

independent variables in that they organise the data into groups. Factor analysis looks for patterns among the variables to discover if an underlying combination of the original variables (a factor) can summarise the original set. Factor analysis also attempts to reduce the number of variables and discover the underlying constructs that explain the variance (Cooper & Schindler 2001:214, 574, 575, 591, 604).

In order to confirm the validity of the grouping of the questions a factor-analysis was done of the instrument:

Table 8.3 Factor analysis of the constructs, male (M) and female (F)

Construct No	13 Constructs developed from the 69 questions (F= Female; M= Male) Acceptability of SMMEs on skills and outcomes re:	Mineigen Criterion: Factors Reported:		Variance explained by factor	Communalities differ from:	Communalities differ to: (highest)
C1	Understanding plans, drawings, layouts & levels	1	F	3.59	0.62	0.83
		1	M	4.27	0.83	0.89
C2	Brickwork, bricklaying, plastering and 'wet-work'	1	F	3.56	0.53	0.75
		1	M	4.32	0.81	0.90
C3	General carpentry, doors, ceiling and roofing	1	F	3.64	0.57	0.82
		1	M	4.27	0.77	0.93
C4	Plumbing, drainage and piping	1	F	3.28	0.78	0.87
		1	M	3.68	0.89	0.95
C5	Electricity, tubing, wiring and lighting	1	F	3.39	0.76	0.91
		1	M	3.68	0.86	0.96
C6	Wall tiling, glazing, painting and floor tiling	1	F	3.33	0.78	0.87
		1	M	3.60	0.87	0.93
C7	Paving, road works, curbing and gabion	1	F	3.85	0.63	0.88
		1	M	4.38	0.83	0.92
C8	Road maintenance, cleaning & grass cutting	1	F	2.86	0.61	0.80
		1	M	3.29	0.79	0.86
C9	Traditional African building, thatching, painting & flooring	1	F	3.86	0.68	0.85
		1	M	3.63	0.70	0.74
C10	General Education, language and terminology	1	F	5.54	0.56	0.81
		1	M	5.68	0.49	0.81
C11	General managerial, finance and business	1	F	4.01	0.74	0.86
		1	M	4.09	0.78	0.87
C12	Future directed, creativity innovation, business plans	1	F	3.47	0.55	0.82
		1	M	3.62	0.64	0.80
C13	Tender, pricing, legal, tax and procurement	1	F	7.28	0.69	0.76
		1	M	7.70	0.70	0.83

Some of the constructs above were combined in an attempt to reduce the total number of constructs. In these cases the 'Mineigen Criterion of Factors Reported' gave two factors, which was not acceptable. Only questions 6.1 to 6.10 that were originally meant to be two constructs, were combined successfully, to analyse one factor as described in Construct 13.

8.4 Statistical tools applied in analysing the responses

8.4.1 Computer programme

The data was analysed by using SAS computer programme (SAS 1988). To serve the purpose of this research, descriptive and inferential statistics were used to analyse the data.

8.4.2 Means and standard deviations

Arithmetic means (\bar{X}) and standard deviations (S) are reported in this research.

The arithmetic mean (\bar{X}) comprises a point, which coincides with the sum of the scores divided by the number of scores. The standard deviation (S) shows the variation about the average of the data.

8.4.3 T-tests

The t-test is used to determine the statistical significance between a sample distribution mean and a parameter. The t has more tail area than that found in the normal distribution. Its measurement level is interval and ratio and can be used in the One-Sample Case and the Two-Sample Case for related samples and independent samples. The t distribution is used especially when the sample size is less than 30 (Cooper & Schindler 2001: 498).

$$t = \frac{\bar{X} - \mu}{S / \sqrt{n}}$$

T-tests were used in this study to determine the significance of the difference between the averages of the answers given by contract providers about male and female entrepreneurs. This test was also applied to determine whether a significant difference existed between the opinions of male and female contract providers about the male and female entrepreneurs. The assumption underlying the t-test is that the population is distributed normally, but needs not hold when the distribution deviates not far from a normal distribution whenever sample size is more than 10 (Rothmann, 1998:183). The t-test is used to determine whether two means are sufficiently different. This test is applicable for the analysis of two-group designs involving either random group design or natural group design. Because the independent samples t-

test is based on the difference between the two sample means, the expected value of t when the independent variable has had no effect, is zero. If the independent variable has had an effect, the t will become increasingly smaller than zero as the mean difference increases. If the smaller mean is subtracted from the larger mean, the t will become increasingly larger than zero. The difference may be taken in either direction, but note whether it is a positive or negative t value. Because sampling error can never be eliminated, the obtained t must be compared with a critical value from the appropriate t -distribution to determine if it is statistically significant (Rothmann 1998:183).

8.4.4 Paired t -tests

Paired t -tests are used to determine the differences between males and females in such a way that the responses on each question are paired to prevent different questions in the group to cancel out one another.

8.4.5 Probability Values (p values) measuring statistical significance

The p -value is the probability of observing a sample value as extreme as, or more extreme than, the value actually observed, given that the null hypothesis is true. This area represents the probability of a Type 1 error that must be assumed if the null hypothesis is rejected. The p -value is compared to the significance level (α) and on this basis the null hypothesis is either rejected or not rejected. If the p value is less than the significance level, the null hypothesis is rejected (if p value $<$ α , reject null). If p is greater than or equal to the significance level, the null hypothesis is not rejected (if p value $>$ α , don't reject null). If the p value is less than 0.05, the null hypothesis will be rejected. The p value is determined by using the standard normal table. The small p value represents the risk of rejecting the null hypothesis. It is the probability of a Type 1 error if the null hypothesis is rejected (Cooper & Schindler 2001:494).

A difference has statistical significance if there is good reason to believe the difference does not represent random sampling fluctuations only. While it is of statistical significance, whether it is of practical significance is another question. If the controller judges that this variation has no real importance, then it is of little practical significance (Cooper & Schindler 2001: 486, 487).

Results will be regarded as significant if the p -values are smaller than 0.05, because this value is used as cut-off point in most behavioural science research.

8.4.6 Cohen-d values measuring practical significance

The practical significance of the results (d-values) will be computed when the p-value was statistically significant ($p \leq 0.05$). According to Steyn (1998:13), Cohen (1977) recommends the following guidelines for practical significance:

d = 0.2 smaller effect;

d = 0.5 medium effect;

d = 0.8 large effect (Steyn, 1998:13):

$$\text{Cohen } d = \frac{\mu_1 - \mu_2}{\sigma} \quad (\text{Cohen 1988})$$

$$\text{or } d = \bar{X} / S \quad (\text{Rothmann, 1998:184})$$

8.4.7 ANOVA (Analysis of variance)

The statistical method for testing the null hypothesis, that the means of several populations are equal, is analysis of variance (ANOVA). The distance from one value to its group's mean should be independent of the distances of other values to that mean (independence of error). ANOVA is reasonably robust and minor variations from normality and equal variance are tolerable. ANOVA uses squared deviations of the variance.

The test statistic for ANOVA is the F ratio. It compares the variance from the last two sources:

$$F = \frac{\text{Between-groups variance}}{\text{Within-groups variance}} = \frac{\text{Mean square}_{\text{between}}}{\text{Mean square}_{\text{within}}}$$

$$\text{Mean square}_{\text{between}} = \frac{\text{Sum of squares}_{\text{between}}}{\text{Degrees of freedom}_{\text{between}}}$$

$$\text{Mean Square}_{\text{within}} = \frac{\text{Sum of squares}_{\text{within}}}{\text{Degrees of freedom}_{\text{within}}}$$

The F distribution determines the size of ratio necessary to reject the null hypothesis for a particular sample size and level of significance (Cooper & Schindler, 2001:509).

8.5 Hypotheses

In each case the alternative hypotheses H_a will be the negative or the opposite of the null hypotheses H_0 .

8.5.1 Construct 1: Understanding plans, drawings, layouts & levels

$H_{0C1.1}$: There is a significant difference in the acceptability regarding skills and outcomes on the **understanding of plans, drawings, layouts & levels**

between male and female construction entrepreneurs as judged by contract and service provides.

H₀C1.2: There is a significant difference in the judgement between male and female contract and service provides' acceptability regarding skills and outcomes on the **understanding of plans, drawings, layouts & levels** of male and female construction entrepreneurs.

H₀C1.3: There is a significant difference in the judgement between the four categories of contract and service provides' acceptability regarding skills and outcomes on the **understanding of plans, drawings, layouts & levels** of male and female construction entrepreneurs.

Instead of running 39 hypotheses (13x3) the following table will summarise the 13 constructs each with its three tests:

Hypothesis summary:

Section	H ₀ (+) & H _a (-)	There is a significant difference in...:	.1 between men & women entrepr. (Paired t)	.2 between male & female respon. (Paired t)	.3 between the four sectors (ANOVA)
8.5.1	H ₀ C1	Understanding plans, drawings, layouts & levels...	H ₀ C1.1	H ₀ C1.2	H ₀ C1.3
8.5.2	H ₀ C2	Brickwork, bricklaying, plastering and 'wet-work'...	H ₀ C2.1	H ₀ C2.2	H ₀ C2.3
8.5.3	H ₀ C3	General carpentry, doors, ceiling and roofing...	H ₀ C3.1	H ₀ C3.2	H ₀ C3.3
8.5.4	H ₀ C4	Plumbing, drainage and piping	H ₀ C4.1	H ₀ C4.2	H ₀ C4.3
8.5.5	H ₀ C5	Electricity, tubing, wiring and lighting...	H ₀ C5.1	H ₀ C5.2	H ₀ C5.3
8.5.6	H ₀ C6	Wall tiling, glazing, painting and floor tiling...	H ₀ C6.1	H ₀ C6.2	H ₀ C6.3
8.5.7	H ₀ C7	Paving, road works, curbing and gabion...	H ₀ C7.1	H ₀ C7.2	H ₀ C7.3
8.5.8	H ₀ C8	Road maintenance, cleaning & grass cutting...	H ₀ C8.1	H ₀ C8.2	H ₀ C8.3
8.5.9	H ₀ C9	Traditional African building, thatching, painting & flooring	H ₀ C9.1	H ₀ C9.2	H ₀ C9.3
8.5.10	H ₀ C10	General Education, language and terminology...	H ₀ C10.1	H ₀ C10.2	H ₀ C10.3
8.5.11	H ₀ C11	General managerial, finance and business...	H ₀ C11.1	H ₀ C11.2	H ₀ C11.3
8.5.12	H ₀ C12	Future directed, creativity innovation, business plans...	H ₀ C12.1	H ₀ C12.2	H ₀ C12.3
8.5.13	H ₀ C13	Tender, pricing, legal, tax and procurement...	H ₀ C13.1	H ₀ C13.2	H ₀ C13.3

8.6. Statistical analysis of the constructs

To portray an overview, the acceptability (opinions on skills and outcomes) of all the respondents will firstly be presented on the male and female construction entrepreneurs for each construct by using the mean and standard deviation. On a 4 point Likert-scale the middle value is 2.5, therefore a mean above 2.5 will be regarded as good and below 2.5 as not good. Secondly, the differences between the male and female entrepreneurs are presented as judged by all 62 respondents by using the paired t-test (P-values) and Cohen-d analysis. Thirdly the acceptability of the 39 female and 23 male respondents on the difference between male and female construction entrepreneurs is presented by using the paired t-test and Cohen-d values. Lastly the acceptability of the different sectors will be analysed by using an ANOVA. C1 is fully described while only the essence of C2 to C13 will be captured.

8.6.1 Construct 1: Understanding plans, drawings, layouts & levels

Table 8.4: Means, Standard deviation and t-test on construct 1: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X}	S
Male	62	2.709	0.868
Female	62	1.755	0.616

Source: SAS worksheets T1 pp15-16

The 62 respondents are of the opinion that male construction entrepreneurs understand, although not very well, technical drawings (2.709 out of 4), while females only received a Mean of 1.755 on this construct, which means that the respondents felt that female construction entrepreneurs do not understand technical drawings.

Table 8.5: Paired t-test on construct 1: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Paired (M-F)	62	0.955	0.757	< 0.0001*	1.3 +++

Source: SAS worksheets T12 p3

* indicates statistical significance

+++ indicates practical significance

The paired M-F difference in means is 0.955 and the p-value of <0.0001 indicates a significant statistical difference of how the 62 respondents felt about male and female construction entrepreneurs. The Cohen-d value of 1.3 indicates a large effect and practical significance. This indicates that the 62 respondents felt that males are much better than females in this construct, C1: Understanding technical drawings.

Table 8.6: Paired t-test on construct 1: The opinions of the 39 female and 23 male respondents on the difference between male and female construction entrepreneurs

Respondents:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Males on M-F	23	0.722	0.710	<0.0001*	1.03 +++
Females on M-F	39	1.092	0.759	<0.0001*	1.44 +++

Source: SAS worksheets T11 p1-2

* indicates statistical significance

+++ indicates practical significance

The male respondents felt that male construction entrepreneurs are significantly better than female construction entrepreneurs regarding Construct 1. The difference in the means is 0.722 and the P-value <0.0001 indicates a significant statistical difference how males judge male and female entrepreneurs. The Cohen-d value of 1.03 indicates practical significance as well as a large effect.

An interesting finding is that the female respondents also feel that male construction entrepreneurs are much better than female construction entrepreneurs regarding construct 1. The difference in means is a large 1.092, the p-value of <0.0001 indicates a statistical significant difference, and the Cohen-d value of 1.44 indicates practical significance as well as a large effect.

Table 8.7: ANOVA for Construct 1:**C1 = Understanding plans, drawings, site layouts and levels**

Sector classification of respondents	N	\bar{X} m-f	S m-f	P	Tukey	d
S1. Officials at DPW allocating and adjudicating tenders to construction SMMEs	18	0.76	0.80	0.17	-	-
S2. Local government officials handling feedback from clients about construction entrepreneurs	11	1.05	0.61			
S3. Financial & training institutions providing services to construction SMMEs and entrepreneurs	12	0.72	0.84			
S4. Private sector construction companies providing opportunities to entrepreneurs (Sub-contracts)	21	1.21	0.70			

The four sectors did not differ statistically significantly because the P-value is 0.17 which is not smaller than 0.05. The Tukey intervals did not indicate a statistical difference between sectors. No Cohen-d values were thus calculated.

8.6.2 Construct 2: Brickwork, bricklaying, plastering and 'wet-work'

Table 8.8: Means and Standard deviation on construct 2: Acceptance of the 62 respondents of male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X}	S
Male	62	3.048	0.725
Female	62	2.042	0.635

A mean above 2.5 is regarded as good and below 2.5 is regarded as not good.

With a mean well above the middle-value of 2.5 (at 3.048) the respondents regarded males as good with brickwork and plastering and women bad (at 2.042).

Table 8.9: Paired t-test on construct 2: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Paired (M-F)	62	1.006	0.717	<0.0001*	1.4 +++

* indicates statistical significance,

+++ indicates practical significance

According to Table 8.9 there is a statistical significant difference ($P < 0.0001$) as well as a practical significant difference ($d = 1.4 =$ large effect). This indicates that males are much better than females with bricks and mortar, or work known as 'wet-work'.

Table 8.10: Paired t-test on construct 2: The opinions of the M+F respondents on the difference between male and female construction entrepreneurs

Respondents:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Males on M-F	23	0.870	0.646	<0.0001*	1.3 +++
Females on M-F	39	1.087	0.752	<0.0001*	1.4 +++

* indicates statistical significance,

+++ indicates practical significance

Both the male and female respondents felt that males are much better with C2. Interesting finding is that the outcomes and skills of female entrepreneurs in construction 'wet-work' are far less acceptable to females than to males, as pointed out by the mean difference and Cohen-d values.

Table 8.11: ANOVA for Construct 2 :

C2 = Brickwork, bricklaying, plastering and 'wet-work'

Sector classification	N	\bar{X}_{m-f}	S_{m-f}	P	Tukey	d
S1. Officials at DPW adjudicating ...	18	0.79	0.67	0.20	-	-
S2. Local government officials ...	11	1.33	0.71			
S3. Financial & training instit ...	12	0.87	0.70			
S4. Private sector construction co ...	21	1.10	0.74			

No statistical significant difference could be detected on C2 amongst the different sectors regarding their acceptability of male and female construction entrepreneurs.

8.6.3 Construct 3: General carpentry, doors, ceiling and roofing

Table 8.12: Means and Standard deviation on construct 3: Acceptance of the 62 respondents of male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X}	S
Male	62	3.045	0.786
Female	62	1.813	0.629

A mean above 2.5 is regarded as good and below 2.5 is regarded as not good.

With a mean of 3.045 (out of 4) the respondents regarded males as good with carpentry work and women even worse than in Construct 2, with only 1.813. This difference is of both statistical and practical significance, according to Table 8.13.

Table 8.13: Paired t-test on construct 3: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Paired (M-F)	62	1.232	0.810	<0.0001*	1.5 +++

* indicates statistical significance,

+++ indicates practical significance

Table 8.14: Paired t-test on construct 3: The opinions of the M+F respondents on the difference between male and female construction entrepreneurs

Respondents:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Males on M-F	23	1.078	0.762	<0.0001*	1.4 +++
Females on M-F	39	1.323	0.833	<0.0001*	1.6 +++

* indicates statistical significance,

+++ indicates practical significance

The findings of C3 are similar to C2, as the female carpentry entrepreneurs are far less acceptable than men, and even C3 females are less acceptable to females!

Table 8.15: ANOVA for Construct 3:
C3 = General carpentry, doors, ceiling and roofing

Sector classification	N	\bar{X}_{m-f}	S _{m-f}	P	Tukey	d
S1. Officials at DPW adjudicating ...	18	0.80	0.67	0.02*	S1 & S2	1.11 +++
S2. Local government officials ...	11	1.65	0.79			
S3. Financial & training instit ...	12	1.20	0.87			
S4. Private sector construction co...	21	1.40	0.76			

In this case the four sectors differ statistically significantly because the P-value is 0.02 which is smaller than 0.05. The Tukey intervals point the difference out to be mainly between S1 and S2 and the Cohen-d value indicates practical significance. This means that S1, the officials of the Department of Public Works (DPW) adjudicating tenders and business opportunities are far more negative than S2 (local government officials handling feedback from clients) about C3 women entrepreneurs.

8.6.4 Construct 4: Plumbing, drainage and piping

Table 8.16: Means and Standard deviation on construct 4: Acceptance of the 62 respondents of male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X}	S
Male	62	2.944	0.899
Female	62	1.685	0.659

A mean above 2.5 is regarded as good and below 2.5 is regarded as not good.

The 62 respondents regarded males as good with plumbing, with a mean of 2.944, and women bad with a mean of only 1.685. The difference in the two means is a sizeable 1.258, the P-, and d-values indicate statistical and practical significance.

Table 8.17: Paired t-test on construct 4: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Paired (M-F)	62	1.258	0.889	<0.0001*	1.4 +++

* indicates statistical significance,

+++ indicates practical significance

Table 8.18: Paired t-test on construct 4: The opinions of the M+F respondents on the difference between male and female construction entrepreneurs

Respondents:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Males on M-F	23	1.130	0.825	<0.0001*	1.4 +++
Females on M-F	39	1.333	0.927	<0.0001*	1.4 +++

* indicates statistical significance,

+++ indicates practical significance

This sizeable difference in acceptability of men and women plumbing entrepreneurs does not differ between the male and female respondents, as in both cases the statistical and practical difference is significant, indicated by the P- and d-values.

Table 8.19: ANOVA for Construct 4: C4 = Plumbing, Drainage and piping

Sector classification	N	\bar{X}_{m-f}	S_{m-f}	P	Tukey	d
S1. Officials at DPW adjudicating ...	18	1.03	0.97	0.26	-	-
S2. Local government officials ...	11	1.70	0.92			
S3. Financial & training instit ...	12	1.27	0.87			
S4. Private sector construction co ...	21	1.21	0.78			

No statistical significant difference could be traced on C4 amongst the different sectors regarding their acceptability of male and female plumbing entrepreneurs. In each sector the difference in the means is more than 1. This means that all the sectors accept men far above women plumbing entrepreneurs.

8.6.5 Construct 5: Electricity, tubing, wiring and lighting

Table 8.20: Means and Standard deviation on construct 5: Acceptance of the 62 respondents of male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X}	S
Male	62	2.964	0.890
Female	62	1.726	0.730

A mean above 2.5 is regarded as good and below 2.5 is regarded as not good.

The means for the Electricity Construct C5 is more or less the same as for Plumbing C4. Women electricity entrepreneurs are not accepted, and the difference in this acceptability is a large 1.238 mean difference. The p-value of <0.0001 indicates a statistical significant difference, and the Cohen-d value of 1.3 indicates practical significance as well as a large effect.

Table 8.21: Paired t-test on construct 5: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Paired (M-F)	62	1.238	0.927	<0.0001*	1.3 +++

* indicates statistical significance,

+++ indicates practical significance

Table 8.22: Paired t-test on construct 5: The opinions of the M+F respondents on the difference between male and female construction entrepreneurs

Respondents:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Males on M-F	23	1.196	0.901	<0.0001*	1.3 +++
Females on M-F	39	1.263	0.952	<0.0001*	1.3 +++

* indicates statistical significance,

+++ indicates practical significance

Not even the female respondents accept women electrical entrepreneurs, because the difference in means is larger for female respondents than male respondents. Similar to the plumbing construct C4, the p-value of <0.0001 of C5 indicates a statistical significant difference, and the Cohen-d value of 1.3 indicates practical significance as well as a large effect.

Table 8.23: ANOVA for Construct 5: C5 = Electricity, tubing, wiring and lighting

Sector classification	N	\bar{X}_{m-f}	S_{m-f}	P	Tukey	d
S1. Officials at DPW adjudicating ...	18	0.78	0.79	0.07	-	-
S2. Local government officials ...	11	1.61	1.11			
S3. Financial & training instit ...	12	1.35	0.95			
S4. Private sector construction co ...	21	1.37	0.83			

There is no statistical or practical significance between the sectors on C5.

8.6.6 Construct 6: Wall tiling, glazing, painting and floor tiling

Table 8.24: Means and Standard deviation on construct 6: Acceptance of the 62 respondents of male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X}	S
Male	62	3.052	0.858
Female	62	2.081	0.782

A mean above 2.5 is regarded as good and below 2.5 is regarded as not good.

Men seem to be acceptable tilers, glazers and painters while women are not.

Table 8.25: Paired t-test on construct 6: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Paired (M-F)	62	0.972	0.827	<0.0001*	1.2 +++

* indicates statistical significance,

+++ indicates practical significance

Although the mean difference is not as big as the previous two constructs, women tiling and painting entrepreneurs are not accepted, and the difference in this acceptability as indicated by the mean difference is also a sizeable 0.972. The p-value of <0.0001 indicates a statistical significant difference, and the Cohen-d value of 1.2 indicates practical significance as well as a large effect.

Table 8.26: Paired t-test on construct 6: The opinions of the M+F respondents on the difference between male and female construction entrepreneurs

Respondents:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Males on M-F	23	0.946	0.846	<0.0001*	1.1 +++
Females on M-F	39	0.987	0.827	<0.0001*	1.2 +++

* indicates statistical significance,

+++ indicates practical significance

When analysing the mean difference, again female respondents agreed slightly more than males that women entrepreneurs in C6 are not acceptable. In both cases the p-value of <0.0001 indicates a statistical significant difference, and the Cohen-d values of 1.1 and 1.2 indicates practical significance as well as a large effect.

Table 8.27: ANOVA for Construct 6:

C6 = Wall tiling, glazing, painting and floor tiling

Sector classification	N	\bar{X}_{m-f}	S_{m-f}	P	Tukey	d
S1. Officials at DPW adjudicating ...	18	0.64	0.75	0.15	-	-
S2. Local government officials ...	11	1.27	1.02			
S3. Financial & training instit ...	12	1.21	0.95			
S4. Private sector construction co ...	21	0.96	0.64			

No statistical significant difference could be reported on the sectors in C6.

8.6.7 Construct 7: Paving, road works, curbing and gabion

Table 8.28: Means and Standard deviation on construct 7: Acceptance of the 62 respondents of male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X}	S
Male	62	2.823	0.909
Female	62	1.813	0.709

A mean above 2.5 is regarded as good and below 2.5 is regarded as not good.

Only the men's paving and roadwork skills and outcomes seem to be acceptable, while the mean for women paving entrepreneurs of 1.8 is far below the middle-value of 2.5, indicating that their skills and outcomes on this construct are not acceptable.

Table 8.29: Paired t-test on construct 7: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Paired (M-F)	62	1.010	0.990	<0.0001*	1.0 +++

* indicates statistical significance,

+++ indicates practical significance

The difference in the means is more than 1 and there is statistical significant as well as a practical significant difference between the two.

Table 8.30: Paired t-test on construct 7: The opinions of the M+F respondents on the difference between male and female construction entrepreneurs

Respondents:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Males on M-F	23	0.852	0.878	0.0001*	1.0 +++
Females on M-F	39	1.103	1.050	<0.0001*	1.1 +++

* indicates statistical significance,

+++ indicates practical significance

It is interesting to note that not even the female respondents accept women paving and road entrepreneurs, because the difference in means is larger for female respondents than male respondents. The p-value of 0.0001 of C7 indicates a statistical significant difference, and the Cohen-d value of 1.0 and 1.1 indicates practical significance as well as a large effect.

**Table 8.31: ANOVA for Construct 7:
C7 = Paving, road works, curbing and gabion**

Sector classification	N	\bar{X}_{m-f}	S_{m-f}	P	Tukey	d
S1. Officials at DPW adjudicating ...	18	0.91	0.92	0.06	-	-
S2. Local government officials ...	11	1.73	0.94			
S3. Financial & training instit ...	12	0.78	1.00			
S4. Private sector construction co ...	21	0.85	0.96			

No statistical significant difference could be reported on the sectors in C7.

8.6.8 Construct 8: Road maintenance, cleaning and grass cutting

Table 8.32: Means and Standard deviation on construct 8: Acceptance of the 62 respondents of male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X}	S
Male	62	2.903	0.733
Female	62	2.181	0.756

A mean above 2.5 is regarded as good and below 2.5 is regarded as not good.

Although still bad the mean for female construction entrepreneurs in this construct, road maintenance, is so far the best at 2.181.

Table 8.33: Paired t-test on construct 8: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Paired (M-F)	62	0.722	0.942	<0.0001*	0.77

* indicates statistical significance,

+++ indicates practical significance

The difference in the acceptability between men and women entrepreneurs regarding Construct 8 is the lowest so far. Although the P-value indicates statistical significant difference, the Cohen-d value indicates only a medium effect.

Table 8.34: Paired t-test on construct 8: The opinions of the M+F respondents on the difference between male and female construction entrepreneurs

Respondents:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Males on M-F	23	0.587	0.894	0.047*	0.66
Females on M-F	39	0.801	0.972	<0.0001*	0.82 +++

* indicates statistical significance,

+++ indicates practical significance

The male respondents seem to be more positive than the females regarding the acceptability of women in construction on road maintenance. The female respondents however, are more negative regarding the acceptance of women in C8, as they present both a statistical and practical significant difference of <0.0001 and 0.82.

**Table 8.35: ANOVA for Construct 8:
C8 = Road maintenance, cleaning and grass cutting**

Sector classification	N	\bar{X}_{m-f}	S_{m-f}	P	Tukey	d
S1. Officials at DPW adjudicating ...	18	0.57	0.81	0.10	-	-
S2. Local government officials ...	11	1.36	0.94			
S3. Financial & training instit ...	12	0.56	1.11			
S4. Private sector construction co ...	21	0.61	0.87			

No statistical significant difference could be reported amongst the sectors in C8.

8.6.9 Construct 9: Traditional African building, thatching, painting and flooring

Table 8.36: Means and Standard deviation on construct 9: Acceptance of the 62 respondents of male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X}	S
Male	62	2.642	0.774
Female	62	2.777	0.846

A mean above 2.5 is regarded as good and below 2.5 is regarded as not good.

This is the first construct where the skills and outcomes of both women and men are acceptable, but with a higher mean for women (2.777) than for men (2.642).

Table 8.37: Paired t-test on construct 9: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Paired (M-F)	62	-0.135	1.150	0.3571	-

* indicates statistical significance,

+++ indicates practical significance

Although it is not regarded as statistically significant, the negative mean difference indicates that women are regarded as better than men in C9.

Table 8.38: Paired t-test on construct 9: The opinions of the M+F respondents on the difference between male and female construction entrepreneurs

Respondents:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Males on M-F	23	-0.157	1.069	0.490	-
Females on M-F	39	-0.123	1.208	0.529	-

* indicates statistical significance,

+++ indicates practical significance

Both male and female respondents agreed that women are better than men on traditional African building, thatching, painting and flooring.

Table 8.39: ANOVA for Construct 9: C9 = Traditional African building, thatching, painting and flooring

Sector classification	N	\bar{X}_{m-f}	S_{m-f}	P	Tukey	d
S1. Officials at DPW adjudicating ...	18	-0.24	1.08	0.03*	C2 & C4	1.11 +++
S2. Local government officials ...	11	0.62	0.73			
S3. Financial & training instit ...	12	0.13	1.32			
S4. Private sector construction co...	21	-0.59	1.11			

Given a P-value of 0.03 the four sectors differ statistically significantly. Tukey intervals point the difference out to be mainly between S2 and S4 and the Cohen-d value indicates practical significance. This means that S4, the private sector allocating business opportunities, are far more positive about women construction entrepreneurs in C9 than S2 (local government officials handling feedback from clients) about women entrepreneurs involved in traditional African building.

8.6.10 Construct 10: General Education, language and terminology

Table 8.40: Means and Standard deviation on construct 10: Acceptance of the 62 respondents of male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X}	S
Male	62	2.351	0.775
Female	62	2.238	0.727

A mean above 2.5 is regarded as good and below 2.5 is regarded as not good.

Worthy of note that neither males nor females have acceptable skills and outcomes regarding education, language and terminology. Both means are below 2.5. This is an important finding as both men and women entrepreneurs are therefore regarded as not up to standard with C10.

Table 8.41: Paired t-test on construct 10: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Paired (M-F)	62	0.113	0.551	0.1115	0.21

* indicates statistical significance,

+++ indicates practical significance

There is also no significant difference between male and female entrepreneurs.

Table 8.42: Paired t-test on construct 10: The opinions of the M+F respondents on the difference between male and female construction entrepreneurs

Respondents:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Males on M-F	23	0.163	0.366	0.0442*	0.45
Females on M-F	39	0.083	0.638	0.420	-

* indicates statistical significance,

+++ indicates practical significance

There is also no significant difference between male and female respondents regarding men and women construction entrepreneurs.

Table 8.43: ANOVA for Construct 10

C10 = General Education, language and terminology

Sector classification	N	\bar{X}_{m-f}	S_{m-f}	P	Tukey	d
S1. Officials at DPW adjudicating ...	18	0.15	0.29	0.29		
S2. Local government officials ...	11	0.34	0.52			
S3. Financial & training instit ...	12	0.14	0.49			
S4. Private sector construction co ...	21	-0.05	0.73			

No statistical significant difference could be reported amongst the sectors in C10.

This is the first construct where everybody seems to agree that the general education, language and terminology skills and outcomes of both men and women in construction are not acceptable.

8.6.11 Construct 11: General managerial, finance and business

Table 8.44: Means and Standard deviation on construct 11: Acceptance of the 62 respondents of male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X}	S
Male	62	2.213	0.838
Female	62	2.103	0.835

A mean above 2.5 is regarded as good and below 2.5 is regarded as not good.

Similar to C10, both male and female construction entrepreneurs' outcomes and skills in C11 (management) are not acceptable, with both means well below 2.5.

Table 8.45: Paired t-test on construct 11: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Paired (M-F)	62	0.110	0.631	0.1762	-

* indicates statistical significance,

+++ indicates practical significance

There is also no significant difference between male and female entrepreneurs.

Table 8.46: Paired t-test on construct 11: The opinions of the M+F respondents on the difference between male and female construction entrepreneurs

Respondents:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Males on M-F	23	-0.070	0.458	0.4737	
Females on M-F	39	0.215	0.698	0.0615	

* indicates statistical significance,

+++ indicates practical significance

There is also no significant difference between male and female respondents regarding men and women construction entrepreneurs regarding C11.

**Table 8.47: ANOVA for Construct 11
C11 = General managerial, finance and business**

Sector classification	N	\bar{X}_{m-f}	S_{m-f}	P	Tukey	d
S1. Officials at DPW adjudicating ...	18	-0.09	0.32	0.46	-	-
S2. Local government officials ...	11	0.24	0.50			
S3. Financial & training instit ...	12	0.15	0.80			
S4. Private sector construction co ...	21	0.19	0.78			

No statistical significant difference could be reported amongst the sectors in C11.

This is the second construct where everybody seems to agree. The general managerial, finance and business skills and outcomes of both men and women in construction are not acceptable, and in fact far below the middle-value of the Likert scale.

8.6.12 Construct 12: Future directed, innovation, creativity, business planning

Table 8.48: Means and Standard deviation on construct 12: Acceptance of the 62 respondents of male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X}	S
Male	62	2.271	0.761
Female	62	2.165	0.719

A mean above 2.5 is regarded as good and below 2.5 is regarded as not good.

Similar to C11, this construct, C12 on future directedness, innovation, creativity, business planning skills and outcomes, is below the acceptable value for both women and men construction entrepreneurs.

Table 8.49: Paired t-test on construct 12: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Paired (M-F)	62	0.106	0.634	0.1912	-

* indicates statistical significance,

+++ indicates practical significance

No significant difference between male and female entrepreneurs is reported.

Table 8.50: Paired t-test on construct 12: The opinions of the M+F respondents on the difference between male and female construction entrepreneurs

Respondents:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Males on M-F	23	-0.043	0.526	0.70	-
Females on M-F	39	0.195	0.681	0.0820	-

* indicates statistical significance,

+++ indicates practical significance

Although male respondents felt that women in construction are slightly better than men, given the Mean difference (m-f) of -0.043, this difference is of no statistical or practical significance according to the P- and d-values.

Table 8.51: ANOVA for Construct 12

C12 = Future directed, innovation, creativity, business planning

Sector classification	N	\bar{X}_{m-f}	S_{m-f}	P	Tukey	d
S1. Officials at DPW adjudicating ...	18	-0.07	0.39	0.37	-	-
S2. Local government officials ...	11	0.36	0.55			
S3. Financial & training instit ...	12	0.10	0.65			
S4. Private sector construction co ...	21	0.12	0.80			

No statistical significant difference could be reported amongst the sectors in C12.

Important to note that neither men nor women in construction is regarded to be future directed, innovation, creativity, and business planning oriented as indicated by C12.

8.6.13 Construct 13: Tender, pricing, legal, tax and procurement

Table 8.52: Means and Standard deviation on construct 13: Acceptance of the 62 respondents of male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X}	S
Male	62	2.253	0.736
Female	62	1.969	0.704

A mean above 2.5 is regarded as good and below 2.5 is regarded as not good.

Both male and female construction entrepreneurs' skills and outcomes are not acceptable regarding Construct 13: tendering, pricing, procurement, etc.

Table 8.53: Paired t-test on construct 13: The opinions of the 62 respondents on male and female construction entrepreneurs

Entrepreneurs:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Paired (M-F)	62	0.284	0.381	<0.0001*	0.75

* indicates statistical significance,

+++ indicates practical significance

Although both women and men are regarded to be low on this construct, women seem to be worse off. The differences in their means are of statistical significance, and the Cohen-d value indicates medium effect.

Table 8.54: Paired t-test on construct 13: The opinions of the M+F respondents on the difference between male and female construction entrepreneurs

Respondents:	N	\bar{X} -difference	S-difference	P-value	Cohen-d
Males on M-F	23	0.196	0.347	0.0130*	0.56
Females on M-F	39	0.336	0.394	<0.0001*	0.85 +++

* indicates statistical significance,

+++ indicates practical significance

Fascinating that female respondents are more negative about women in construction than male respondents. Contrary the male respondents, the females reported a statistical significant difference, a practical significance as well as a large effect.

Table 8.55: ANOVA for Construct 13

C13 = Tender, pricing, legal, tax and procurement

Sector classification	N	\bar{X}_{m-f}	S_{m-f}	P	Tukey	d
S1. Officials at DPW adjudicating ...	18	0.10	0.20	0.02*	S4 & S1	0.90 +++
S2. Local government officials ...	11	0.42	0.46			
S3. Financial & training instit ...	12	0.19	0.29			
S4. Private sector construction co ..	21	0.42	0.44			

Although both means are low, a statistical significant difference can be reported amongst the sectors S1 and S4. Tender, pricing, legal, tax and procurement skills and outcomes need to receive urgent attention for both men and women entrepreneurs before they will be acceptable.

8.7 Findings

Please refer to Section 8.5 for the interpretation of the findings summary

Table 8.56: Summary of findings

Section	H ₀ (+) & H _a (-)	There is a significant difference in...:	.1 between men & women entrepr. (Paired t)	.2 between male Mr, female Fr respondents. (Paired t)	.3 between the four sectors (ANOVA)
8.7.1	H ₀ C1	Understanding plans, drawings, layouts & levels...	H ₀ ✓ *+++ M+	H ₀ ✓ *+++ M+	H ₀ ^x (rejected)
8.7.2	H ₀ C2	Brickwork, bricklaying, plastering and 'wet-work'...	H ₀ ✓ *+++ M+	H ₀ ✓ *+++ M+	H ₀ ^x (rejected)
8.7.3	H ₀ C3	General carpentry, doors, ceiling and roofing...	H ₀ ✓ *+++ M+	H ₀ ✓ *+++ M+	H ₀ ✓ *+++S1&S2
8.7.4	H ₀ C4	Plumbing, drainage and piping	H ₀ ✓ *+++ M+	H ₀ ✓ *+++ M+	H ₀ ^x (rejected)
8.7.5	H ₀ C5	Electricity, tubing, wiring and lighting...	H ₀ ✓ *+++ M+	H ₀ ✓ *+++ M+	H ₀ ^x (rejected)
8.7.6	H ₀ C6	Wall tiling, glazing, painting and floor tiling...	H ₀ ✓ *+++ M+	H ₀ ✓ *+++ M+	H ₀ ^x (rejected)
8.7.7	H ₀ C7	Paving, road works, curbing and gabion...	H ₀ ✓ *+++ M+	H ₀ ✓ *+++ M+	H ₀ ^x (rejected)
8.7.8	H ₀ C8	Road maintenance, cleaning & grass cutting...	H ₀ ✓ *++ M+	H ₀ ✓ *+++ M+	H ₀ ^x (rejected)
8.7.9	H ₀ C9	Traditional African building, thatching, painting & flooring	H ₀ ^x (rejected; F+)	H ₀ ^x F+	H ₀ ✓ *+++S2&S4
8.7.10	H ₀ C10	General Education, language and terminology...	H ₀ ^x (rejected; M+)	MrH ₀ ✓ * M+; FrH ₀ ^x	H ₀ ^x (rejected)
8.7.11	H ₀ C11	General managerial, finance and business...	H ₀ ^x (rejected; M+)	H ₀ ^x (rej;MrF+FrM+)	H ₀ ^x (rejected)
8.7.12	H ₀ C12	Future directed, creativity innovation, business plans...	H ₀ ^x (rejected; M+)	H ₀ ^x (rej;MrF+FrM+)	H ₀ ^x (rejected)
8.7.13	H ₀ C13	Tender, pricing, legal, tax and procurement...	H ₀ ✓ *++ M+	H ₀ ✓ *++ M+	H ₀ ✓ *+++S4&S1

H₀^x indicates that the null hypothesis is rejected and the alternative H_a is accepted;

H₀✓ indicates that the null hypothesis is accepted (or cannot be rejected);

* indicates statistical significance;

+++ indicates practical significance, + low effect, ++ medium effect, +++ large effect;

M+ indicates that the means of males are higher than the means of females, taking into account the paired t-test of M-F. (If M+ it implies that male entrepreneurs are regarded to better in the construct than female entrepreneurs);

F+ indicates that the means of female entrepreneurs are higher than the means of males (If F+ it implies that female entrepreneurs are regarded to better in the specific construct than males).

Mr Male respondents and Fr Female respondents will only be reported on if they responded differently regarding male & female entrepreneurs, e.g. C10 to C12.

Table 8.56 specifies: $H_0 \checkmark$ * +++ M+ for the constructs C1 to C8 for both columns .1 and .2. This entails that the null hypotheses are accepted for C1 to C8, which are more or less all technical skills and outcomes. The acceptance of H_0 imply a significant statistical (*) and practical (+++) difference in the acceptability of the outcomes and skills of male and female entrepreneurs. In all these cases the difference in means (M-F) are positive, indicating that the means of males are higher than the means of females. M+ thus implies that the male and female respondents both feel that males are significantly better than female construction entrepreneurs in technical skills and outcomes. Interesting to note that these technical outcomes and skills of women construction entrepreneurs are not acceptable even for the female respondents.

Except for C3, Carpentry, no significant difference could be found amongst the four sectors regarding the acceptability of male and female construction entrepreneurs. For C3, Carpentry, the analysis of variance (Anova) pointed out that the officials of the Department of Public Works (DPW) adjudicating tenders and business opportunities are far more negative than the local government officials handling feedback from clients about C3, women carpentry entrepreneurs. This is in line with the queries of women in construction that because of such barriers they are not able to access the available business opportunities in order to prove their skills and outcomes.

In construct 9 F+ indicates that both male and female respondents agreed that women are better than men on traditional African building, thatching, painting and flooring. The differences were however not significant. An important finding is that the Anova pointed out that the private sector allocating business opportunities, are far more positive than the local government officials in accepting women entrepreneurs involved in traditional African building.

Constructs 10 to 13, which are education, management and business related, tell a totally different story. In all four constructs neither males nor females have acceptable skills and outcomes because all their means are below 2.5. This finding has profound implications regarding the planning of training strategies for both men and women construction entrepreneurs. The past emphasis placed on technical training should make place for education, management and business related training programmes.

Due to the low means both the statistical and practical difference for C10Fr, C11 and C12 were insignificant, therefore the H_0 are rejected. The H_0 are accepted for C10Mr and C13.

On C13 (tendering) it was found that even female respondents are more negative about women in construction than male respondents. This strengthens the belief of women in construction that their tenders are not accepted.

In C11 (management) and C12 (innovation) female respondents accepted male entrepreneurs above women construction entrepreneurs, while male respondents accepted women construction entrepreneurs above males.

The Anova pointed out a statistical and practical difference in C13 (tendering) between the opinions of the private sector S4 and S1 DPW adjudicating tenders. This implies that the DPW finds the outcomes and skills of women entrepreneurs on tendering acceptable, while the private sector does not agree that their skills and outcomes on tendering are at an acceptable standard. This finding is also in line with the opinion of women in construction that they do not get adequate access to construction business opportunities.

Given the results of the Cronbach Alpha and Factor analysis, the instrument developed to apply the logical thinking approach especially for the acceptability element of the Outcomes construct, proved to be reliable and valid. This instrument could be used for similar studies in future.

- To apply the Logical thinking approach of evaluation, specifically the acceptability and utilization elements, to woman construction entrepreneurs by
- Doing an opinion survey of the acceptability and utilization of the South African Women in Construction Association (SAWIC) amongst 341 construction entrepreneurs.
- To develop an instrument to measure the above based on the evaluation constructs developed from the literature.

9.2 Research design and methodology for this chapter

9.2.1 Statistical methodology

As part of the SAWIC Research Program a questionnaire was designed and circulated amongst delegates at SAWIC meetings held in all nine provinces during May to September 2002. Six versions of the questionnaire were developed and pilot tested before the final one was used. After the questionnaire was filled out a short