

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter synthesizes and analyses survey data collected during the course of the research. The questionnaire is the main data collection method of the study. It is divided into the following seven sub headings: Data Preparation, Sample Profile, Confirmatory Factor Analysis, Status of Competitive Intelligence in Indian Retail Industry, Competitive Intelligence and Strategy Formulation, and Competitive Intelligence and Business Performance. Data Preparation heading is further divided into the following subheadings: data cleaning, missing value analysis and treatment of missing value. Sample profile describes the characteristics of the sample. Confirmatory factor analysis section discusses the relevance of Calof and Dishman's Model of CI and its applicability in the Indian retail industry. Status of Competitive Intelligence in Indian Retail Industry section describes the performance of the Indian retail industry on various factors of competitive intelligence. Competitive Intelligence and Strategy Formulation discusses how Indian retail industry is using competitive intelligence for strategy formulation. Competitive Intelligence and Business Performance section discuss the quantitative analysis of competitive intelligence and its relation to business performance through a Chi-Square test.

4.2 Data Preparation

After the data collection, data preparation is the process of cleaning the data for various anomalies. The steps including in the data preparation process are data editing, data coding, data entry, and data cleaning. Data preparation process helps in

creating data which is ready for analysis. It is essential to clean the raw data before data analysis because erroneous data can be evidence for the wrong conclusion and defeat the purpose of the research.

4.2.1 Editing

Data editing is the first step in data preparation. It is the process of reviewing the raw data for any kind of errors and omissions and corrects them wherever feasible. The function of editing is to produce data which is correct and reliable according to the objective of the inquiry. The first step in data editing is to check for acceptance of questionnaires. Out of 187 questionnaires collected in the field, 7 questionnaires have been discarded in the field itself because of unengaged responses and a large proportion of missing values. Editing is the review of the questionnaires with the objective of increasing accuracy. There are 6 questionnaires which have been rejected because of the inconsistencies in response. This resulted in a final sample size of 174 respondents.

4.2.2 Coding

Data Coding is the process of assigning numbers to the options provided in the questions. Data Coding helps to combine the responses into a restricted number of categories. The way to build up a coding formation is to design a codebook. A codebook includes all variables in the questionnaire and specifies the coding rules to the variable. The codebook of the research is attached as an Appendix-J.

4.2.3 Data entry

After the coding of the questionnaire, the researcher enters the data into a system or computer software. The process of entering the data in to computer software is called data entry. It can be done indifferent ways for example manual with the help of a

keyboard, data entry through scanning. The researcher enters the data in to SPSS through manual data entry by using a keyboard.

4.2.4 Data Cleaning

Data Cleaning is the process of identifying missing values and outliers in the data and treatment of missing values and outliers. Missing value symbolizes values of a variable that is unidentified; either because respondents give an unambiguous response or their response was not correctly recorded. According to Hair, Black, Babin, & Anderson(2015) the process of identifying missing data has the following steps: “Determining the type of missing data, determining the extent of missing data, diagnosing the randomness of the missing data, selecting the imputation method”(Hair, Black, Babin, & Anderson, 2015).

4.2.5 Missing Value Analysis

The researcher did missing value investigation of the data in three parts: missing value analysis case wise, missing value analysis for categorical variables (Part A of the questionnaire), and missing value analysis for metric variables.

The total number of questionnaire were 174, which had been entered into SPSS for data analysis. After feeding the data in to the SPSS, case wise missing value analysis was done on the data. The researcher found the following cases have more than 15% missing value. These cases have a high percentage of missing value.

Table 4.1: Cases of High Percentage of Missing Value

Case Number	Missing Value Percentage
2	20.9
5	19.4
100	19.4
101	43.3
102	46.3
107	26.9

After removing the case numbers 2, 5, 100,101,102 and 107, from the analysis, the case wise missing value for a remaining sample of 168 is under acceptable limit less than 10 percent (Hair, Black, Babin, & Anderson, 2015).

The missing value analysis of categorical variables (Part A of the questionnaire) was found out as shown in Table 4-2.

Table 4.2: Univariate Statistics of Categorical Variables

Univariate Statistics of Categorical variables			
	N	Missing	
		Count	Percent
Total_employee	163	5	3.0
Designation	165	3	1.8
Gender	168	0	.0
Qualification	168	0	.0
Duration_with_company	157	11	6.5
Formal_CI_Department	168	0	.0
Duration_CI	127	41	24.4
Name_CI_Department	157	11	6.5
Employee_CI_Department	133	35	20.8

The missing values for each question of section A of the questionnaire are shown in Table 4-2. It was found out that the variable gender, qualification and question about the company having a competitive intelligence department has no missing value. The total employees, designation, duration with the company and name of competitive intelligence department have missing value percentage 3, 1.8, 6.5 and 6.5 respectively. These missing values are under the acceptable limit of 10 percent.

The two variable Duration_CI (Question 8, If Yes how long has it been operational?) and Employee_CI_Department (Question 10, Number of employees working full time in Competitive Intelligence Department) have high missing values but it is logical missing values because the firms which do not have formal competitive intelligence department or the firms which were answering “No” to formal competitive intelligence department are not eligible to answer to operationality of the competitive intelligence department and number of full time employees in competitive intelligence department. Table 4-3 and Table 4-4 show the missing values represented by code 99 which is logical missing value and code 9 is a real missing value. The real missing value for Duration_CI and Employee_CI_Department are 1.2% and 0.6 respectively as shown in Table 4-3 and Table 4-4.

Table 4.3: Tenure Wise Operationality of Competitive Intelligence Department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	>5 years	110	65.5	86.6	86.6
	3 to <5 years	16	9.5	12.6	99.2
	5	1	.6	.8	100.0
	Total	127	75.6	100.0	
Missing	99(Logical Missing)	39	23.2		
	9(Real Missing)	2	1.2		
	Total	41	24.4		
Total		168	100.0		

Table 4.4: Number of Full Time Employee in Competitive Intelligence Department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More Than 15	111	66.1	83.5	83.5
	11-15	13	7.7	9.8	93.2
	6-10	5	3.0	3.8	97.0
	1-5	2	1.2	1.5	98.5
	5	2	1.2	1.5	100.0
	Total	133	79.2	100.0	
Missing	99(Logical Missing)	34	20.2		
	9(Real Missing)	1	.6		
	Total	35	20.8		
Total		168	100.0		

Missing value analysis for metric variables:

In the case of metric variables, 36 variables are found with missing value but all the missing value percentage is under 5. The maximum missing value in the variable Technology Adoption (D2_S9) is 4.17 percent. The second highest missing value is in the case of the variable “We make competitive Intelligence (e.g. collection and analysis technique) available to our employees” (S11); it is 3.97. Two more variables have a missingvalue of more than 2 percent remaining 32 variables have a missingvalue of less than 2 per cent as shown in Table 4-5.

Table 4.5: Missing Value Analysis of Metric Variable

Variable	N	Mean	Std. Deviation	Missing	
				Count	Percent
D2_S11	161.00	2.64	0.99	7.00	4.17
S9	162.00	3.10	1.10	6.00	3.57
S4	163.00	4.12	0.86	5.00	2.98
D1_S4	164.00	4.10	0.81	4.00	2.38
S1	165.00	4.45	0.74	3.00	1.79
S11	165.00	3.73	1.00	3.00	1.79
S22	165.00	3.91	1.00	3.00	1.79
S25	165.00	3.63	1.07	3.00	1.79
S26	165.00	3.01	0.99	3.00	1.79
S33	165.00	3.00	1.08	3.00	1.79
D1_S1	165.00	4.27	0.73	3.00	1.79
D2_S2	165.00	2.98	0.92	3.00	1.79
S6	166.00	3.55	1.01	2.00	1.19
S14	166.00	3.63	1.02	2.00	1.19
S17	166.00	3.72	1.13	2.00	1.19
S23	166.00	3.71	1.08	2.00	1.19
BP2	166.00	3.99	0.83	2.00	1.19
BP4	166.00	4.03	0.78	2.00	1.19
BP5	166.00	4.08	0.70	2.00	1.19
S7	167.00	3.23	0.99	1.00	0.60
S10	167.00	3.69	1.07	1.00	0.60
S16	167.00	3.80	1.11	1.00	0.60
S21	167.00	3.58	0.98	1.00	0.60
S24	167.00	3.90	0.98	1.00	0.60
S28	167.00	3.81	0.99	1.00	0.60
S32	167.00	2.92	1.04	1.00	0.60
S35	167.00	2.89	1.02	1.00	0.60
S36	167.00	3.09	0.99	1.00	0.60
S37	167.00	3.32	1.09	1.00	0.60
S38	167.00	3.46	1.07	1.00	0.60
D1_S2	167.00	4.21	0.78	1.00	0.60
D1_S5	167.00	3.96	0.80	1.00	0.60
BP1	167.00	4.05	0.79	1.00	0.60
BP3	167.00	3.96	0.78	1.00	0.60
BP6	167.00	4.10	0.75	1.00	0.60
BP8	167.00	4.16	0.79	1.00	0.60

Further analysis of missing value by “Little’s MCAR test was performed to identify non response biasness. This test was done by the researcher to find out the pattern in missing values of categorical variables and metric variables. The chi square value is 2061.433, DF=2246, Sig = .998. The null hypothesis for Little's MCAR test is that there is no difference between expected missing values and observed missing values. As the p- value is higher than 0.05, accept the null hypothesis of the test that expected missing values and observed missing values are the same it is concluded that there is no pattern in missing values.

4.2.6 Treatment of Missing Values

According to Hair, Black, Babin, & Anderson(2015) there are four ways to treat missing values: “Substituting missing value with a neutral value, Substituting an imputed response by following a pattern of respondent’s other responses, Case wise deletion, in which respondents with any missing responses are discarded from the analysis, Pair wise deletion, wherein only the respondents with complete responses for that specific variable are included” (Hair, Black, Babin, & Anderson, 2015).

In the data, the missing values are not very high and not following any pattern. Missing values are missing completely at random (MCAR). The missing value of categorical value has not been imputed. The missing values of metric variables are filled with a median of each variable. After imputing missing values, the variables are saved as the same variables as shown in Table 4-6.

Table 4.6: Missing Value Imputation of Metric Variables

	Variable	Number of Replaced Missing Values	Number of Valid Cases	Creating Function
1	S1	3	168	MEDIAN(S1,ALL)
2	S4	5	168	MEDIAN(S4,ALL)
3	S6	2	168	MEDIAN(S6,ALL)
4	S7	1	168	MEDIAN(S7,ALL)
5	S9	6	168	MEDIAN(S9,ALL)
6	S10	1	168	MEDIAN(S10,ALL)
7	S11	3	168	MEDIAN(S11,ALL)
8	S14	2	168	MEDIAN(S14,ALL)
9	S16	1	168	MEDIAN(S16,ALL)
10	S17	2	168	MEDIAN(S17,ALL)
11	S21	1	168	MEDIAN(S21,ALL)
12	S22	3	168	MEDIAN(S22,ALL)
13	S23	2	168	MEDIAN(S23,ALL)
14	S24	1	168	MEDIAN(S24,ALL)
15	S25	3	168	MEDIAN(S25,ALL)
16	S26	3	168	MEDIAN(S26,ALL)
17	S28	1	168	MEDIAN(S28,ALL)
18	S32	1	168	MEDIAN(S32,ALL)
19	S33	3	168	MEDIAN(S33,ALL)
20	S35	1	168	MEDIAN(S35,ALL)
21	S36	1	168	MEDIAN(S36,ALL)
22	S37	1	168	MEDIAN(S37,ALL)
23	S38	1	168	MEDIAN(S38,ALL)
24	D1_S1	3	168	MEDIAN(D1_S1,ALL)
25	D1_S2	1	168	MEDIAN(D1_S2,ALL)
26	D1_S4	4	168	MEDIAN(D1_S4,ALL)
27	D1_S5	1	168	MEDIAN(D1_S5,ALL)
28	D2_S2	3	168	MEDIAN(D2_S2,ALL)
29	D2_S11	7	168	MEDIAN(D2_S11,ALL)
30	BP1	1	168	MEDIAN(BP1,ALL)
31	BP2	2	168	MEDIAN(BP2,ALL)
32	BP3	1	168	MEDIAN(BP3,ALL)
33	BP4	2	168	MEDIAN(BP4,ALL)
34	BP5	2	168	MEDIAN(BP5,ALL)
35	BP6	1	168	MEDIAN(BP6,ALL)
36	BP8	1	168	MEDIAN(BP8,ALL)

4.3 Sample Profile

To study the profile of the respondents, questions were divided into two parts: the profile of the firm and profile of the respondent. Profile of the firm includes the following variables:

1. The sector of the retail industry.
2. A total number of employees in the firm.
3. Does the firm have a formal competitive intelligence department?
4. The department which deals with the competitive intelligence in the firm.

Profile of the Respondent includes the following variables.

1. Designation in the firm.
2. Gender
3. Educational Qualification
4. Duration with the firm.

Profile of the respondent firms: 168 firms were selected from 20 sectors of the retail industry as shown in Table 4-7. The maximum number of firms was representing apparel sector followed by footwear and electronics sector whereas Bathroom Accessories, Eye care and Eyewear, Furniture retail, Sports, Super market, Travel & Tourism have the least representation in the data.

Table 4.7: Retail Sector of Responding Firm

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Apparel	87	51.8	51.8	51.8
Footwear	17	10.1	10.1	61.9
Electronics	10	6.0	6.0	67.9
Fashion	10	6.0	6.0	73.8
Food & Beverages	9	5.4	5.4	79.2
Ayurvedic Beauty Product	5	3.0	3.0	82.1
Grocery Store	5	3.0	3.0	85.1
Departmental Store	3	1.8	1.8	86.9
Home Interior Products	3	1.8	1.8	88.7
Jewellery	3	1.8	1.8	90.5
Kids Retail	3	1.8	1.8	92.3
Lifestyle	3	1.8	1.8	94.0
Gift Retail	2	1.2	1.2	95.2
Watches	2	1.2	1.2	96.4
Bathroom Accessories	1	.6	.6	97.0
Eye care and Eyewear	1	.6	.6	97.6
Furniture Retail	1	.6	.6	98.2
Sports	1	.6	.6	98.8
Super Market	1	.6	.6	99.4
Travel & Tourism	1	.6	.6	100.0
Total	168	100.0	100.0	

Out of a total of 168 firms which participated in the survey 146 firms have more than 100 employees as shown in Table 4-8 and Figure 4-1. Only one firm has fewer than

10 employees and 5 firms have employees' strength between 10 to 50 employees. It shows that most of the firms chosen for the purpose of the study are large in size.

Table 4.8: Number of Employees Wise Profile of the Company

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More than 100	146	86.9	89.6	89.6
	51-100	11	6.5	6.7	96.3
	10-50	5	3.0	3.1	99.4
	Less than 10	1	.6	.6	100.0
	Total	163	97.0	100.0	
Missing	9	5	3.0		
Total		168	100.0		

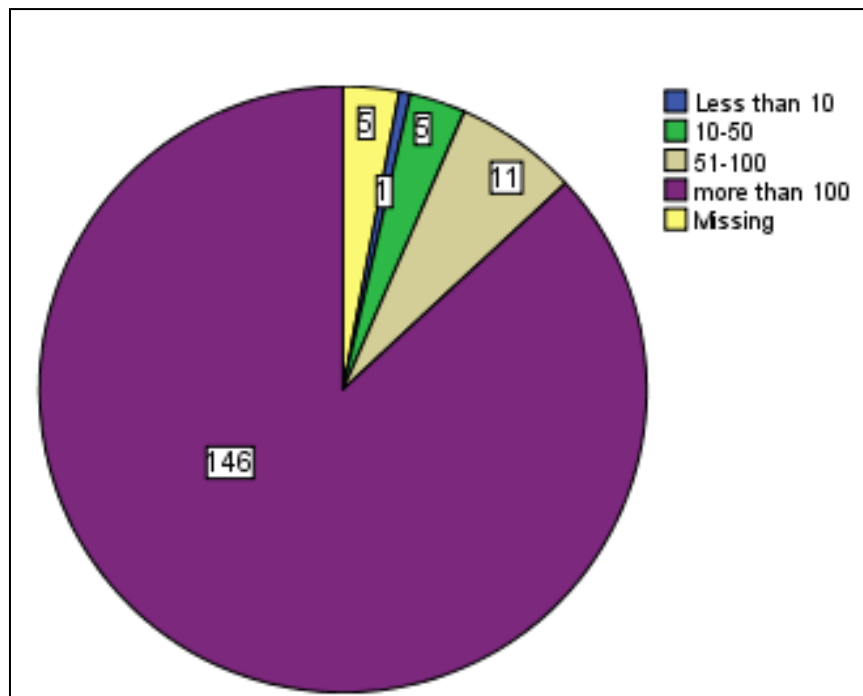


Figure 4.1: Number of Employees Wise Profile of the Company

Formal competitive intelligence department: As per the Table 4-9 Out of a total of 168 firms 130 firms have formal competitive intelligence department.

Table 4.9: Existence of Formal Competitive Intelligence Department

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Yes	130	77.4	77.4	77.4
	No	38	22.6	22.6	100.0
	Total	168	100.0	100.0	

The department which deals with the competitive intelligence in the firm: Out of 168 firms 65 firms have Marketing/Market Research which deals with competitive intelligence activities in their organization, 61 firms Sales and 24 firms Research & Development department deals with competitive intelligence activities in their organization as shown in Table 4-10. Nine firms have shown no response to this question.

Table 4.10: Department Dealing with Competitive Intelligence Activities

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Marketing/Market Research	65	38.7	41.4	41.4
	Sales	61	36.3	38.9	80.3
	Research& Development	24	14.3	15.3	95.5
	Separate Dedicated Department	3	1.8	1.9	97.5
	Information Technology	2	1.2	1.3	98.7
	Corporate Planning	1	0.6	0.6	99.4
	Other	1	0.6	0.6	100.0
	Total	157	93.5	100.0	
Missing	9	11	6.5		
Total		168	100.0		

The profile of respondent who represented the firms in the study includes his designation, gender, and qualification and duration of working with the firm. In terms of designation, the maximum representation is from store managers, out of 168 respondents 141 were store managers, 21 were head of marketing or strategic division, 3 had the designation of CEO as shown in Table 4-11 and Figure 4-2. Nine firms have shown no response to this question.

Table 4.11: Designation Wise Profile of the Respondent

Designation of Respondent in Firm					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Store Manager	141	83.9	85.5	85.5
	Head of Marketing/Strategic Division	21	12.5	12.7	98.2
	CEO/Director	3	1.8	1.8	100.0
	Total	165	98.2	100.0	
Missing	9	3	1.8		
Total		168	100.0		

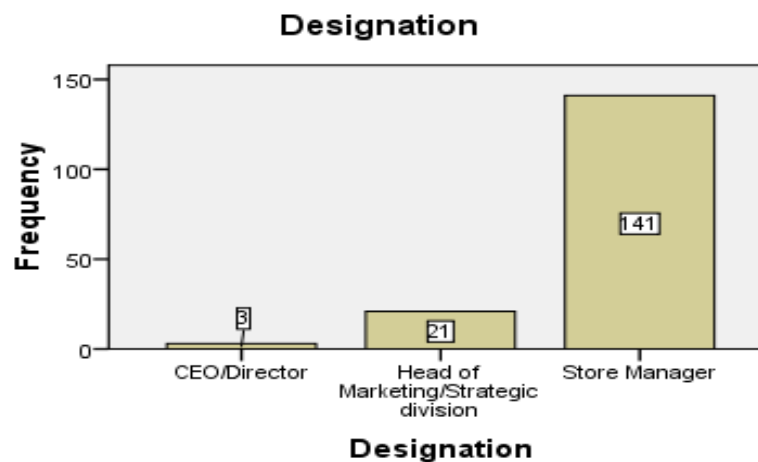


Figure 4.2: Designation Wise Profile of the Respondent

From Table 4-12 and Figure 4-3, it can be analyzed that out of 168 respondents 140 respondents were male and 28 were female. Out of 168 respondents' 123 respondents have post graduates educational qualification and 31 are undergraduates as shown in Table 4-13 and Figure 4-4.

Table 4.12: Gender Wise Profile Summary of the Respondents

Gender of Respondent					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	140	83.3	83.3	83.3
	Female	28	16.7	16.7	100.0
	Total	168	100.0	100.0	

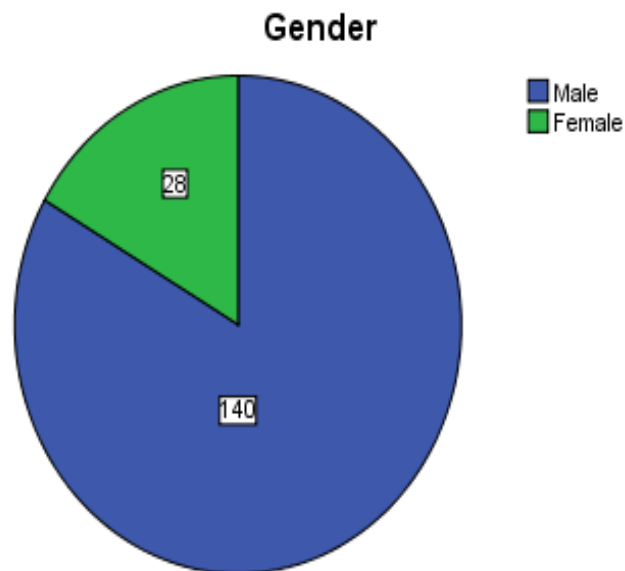


Figure 4.3: Gender Wise Profiles of the Respondents

The 91.7 per cent of respondent have Post graduate and graduate educational qualification.

Table 4.13: Qualification Wise Profile of Respondent

Qualification of Respondent				
	Frequency	Percent	Valid Percent	Cumulative Percent
Undergraduate	31	18.5	18.5	18.5
Post Graduate	123	73.2	73.2	91.7
Other	14	8.3	8.3	100
Total	168	100		

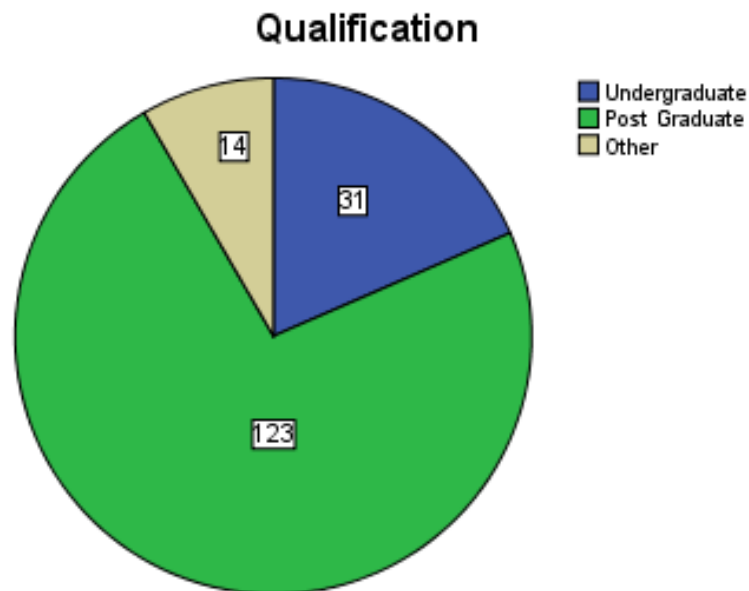


Figure 4.4: Qualification Wise Profile of Respondent

140 respondents have been working with the firm for 5 years or more than 5 years as shown in Table 4-14. Only two respondents working for less than 3 years participated in the survey.

Table 4.14: Duration of Respondent's Service with Organization

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	5 years or More than 5 Years	140	83.3	89.2	89.2
	More than 3 years to Less than 5 years	13	7.7	8.3	97.5
	Less than 1 Year	2	1.2	1.3	98.7
	More than 1 year to Less than 3 Years	2	1.2	1.3	100.0
	Total	157	93.5	100.0	
Missing	System	11	6.5		
Total		168	100.0		

4.4 Confirmatory Factor Analysis

It is a multivariate statistical technique which is applied to the analysis, how fit the measured statements signify the latent variable. It is also applied to confirm or reject the theory. According to previous researches, competitive intelligence capability of a firm depends upon the Process of CI and the Context of CI. In the research, the confirmatory factor analysis is applied to Competitive Intelligence Process and Competitive Intelligence Context separately. The research is explained through the following four stage process:

Stage 1: Define Individual Constructs

Stage 2: Develop the Overall Measurement Model

Stage 3: Design a Study to Produce Empirical Results

Stage 4: Assess Measurement Model Validity

4.4.1 Normality and Reliability Assessment

Before applying the confirmatory factor analysis, the normality and reliability has to be checked for the data set. To test normality Kolmogorov Smirnov test was used under which following hypotheses were tested.

H0: The sample data are not significantly different than a normal population.

H1: The sample data are significantly different than a normal population

The K-S test was conducted and the test values are shown in table 4.15. Since the p value [(Asymp. Sig. (2-tailed))] is greater than 0.05, we accept the null hypothesis which means that the data are normal. Reliability is already explained in chapter -3, page number 55.

Table 4.15: Tests of Normality

Variable	Mean	Std. Deviation	Kolmogorov-Smirnova			Reliability Analysis	
			Statistic	df	Sig.	Croanbach's Alpha	No. of Items
Planning and Focus	15.30	4.05	.995	168	.152	0.867	5
Collection	15.85	4.16	1.061	168	.119	0.836	5
Communication and Analysis	33.00	5.69	.865	168	.165	0.895	7
Awareness	16.39	2.95	.783	168	.217	0.828	4
Internal Information	20.31	4.86	1.208	168	.089	0.892	6
Formal Infrastructure	18.50	4.41	1.227	168	.115	0.875	5
Employee Involvement	9.58	2.52	1.149	168	.123	0.773	3
Business Performance	32.54	7.91	1.426	168	.136	0.892	8

4.4.2 The Competitive Intelligence Process Model

4.4.2.1 Definition of Individual Constructs

The definition of constructs and items are derived from either one of the following two common approaches, that is, scale from previous research or new scale development. Researcher operationalized the constructs from previous research as discussed in chapter three. According to Saayman, et al., (2008) the evidence of the CI process was there but the process had only three factors Planning and Focus, Collection, Analysis and Communication. On the basis of the given statements and factors, the model has been built according to the output of previous researches as shown in Figure 4.5.

4.4.2.2 Development of the Measurement Model

The model displays 17 measured indicator variables and three latent constructs. Three constructs have been identified from the theory in the competitive intelligence process model.

The model is based on the assumption of reflective measurement theory; the latent construct causes the measured variable. Thus, the arrows are drawn from latent constructs to measured variables. The constructs are independent and permitted to connect with all other latent factors. Each measured statement is permitted to connect with only one factor. Planning and Focus (F1), and Collection (F2) are indicated by five measured statements and Communication and Analysis (F3) is indicated by seven statements. All latent constructs are identified individually and model has more degree of freedom than paths to be estimated.

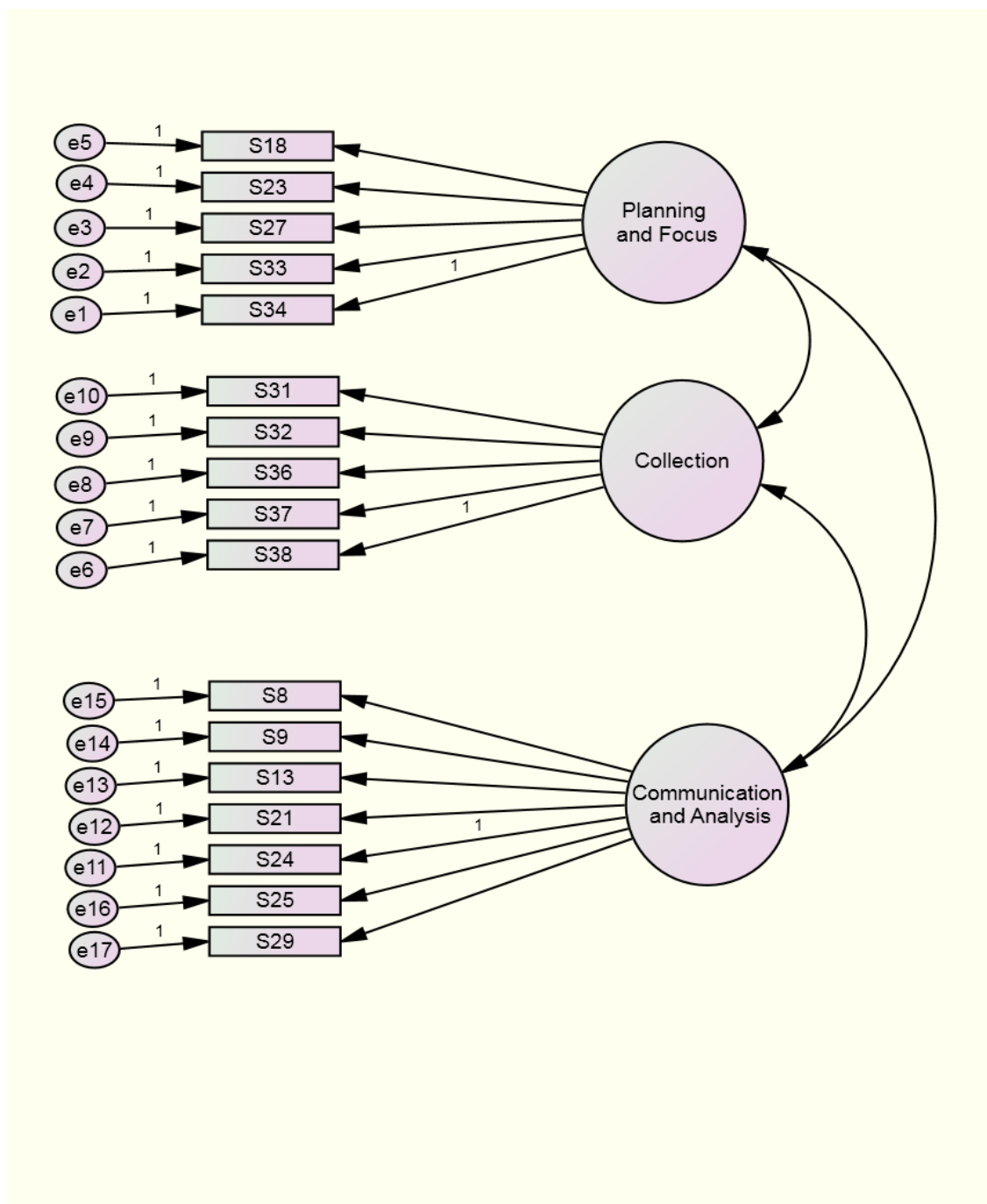


Figure 4.5: Competitive Intelligence Process Model

4.4.2.3 Designing Study to Produce Empirical Results

The issues related to missing data and data cleaning were discussed in the section of data preparation in detail. The model has 17 variables so the total number of unique variance and covariance terms is

$(17 \times 18)/2 = 153$

The total number of estimated parameters = 20 (variance of error terms and latent construct) + 14 (parameters are estimated for loading) + 3 (Unique covariance among construct) = 37.

The model is identified because 153 are greater than 37 and the degree of freedom is 116.

A number of distinct sample moments = 153

A number of distinct parameters to be estimated = 37

Degree of Freedom = $153 - 37 = 116$

The standardized estimated output of the model is shown in Figure 4-6.

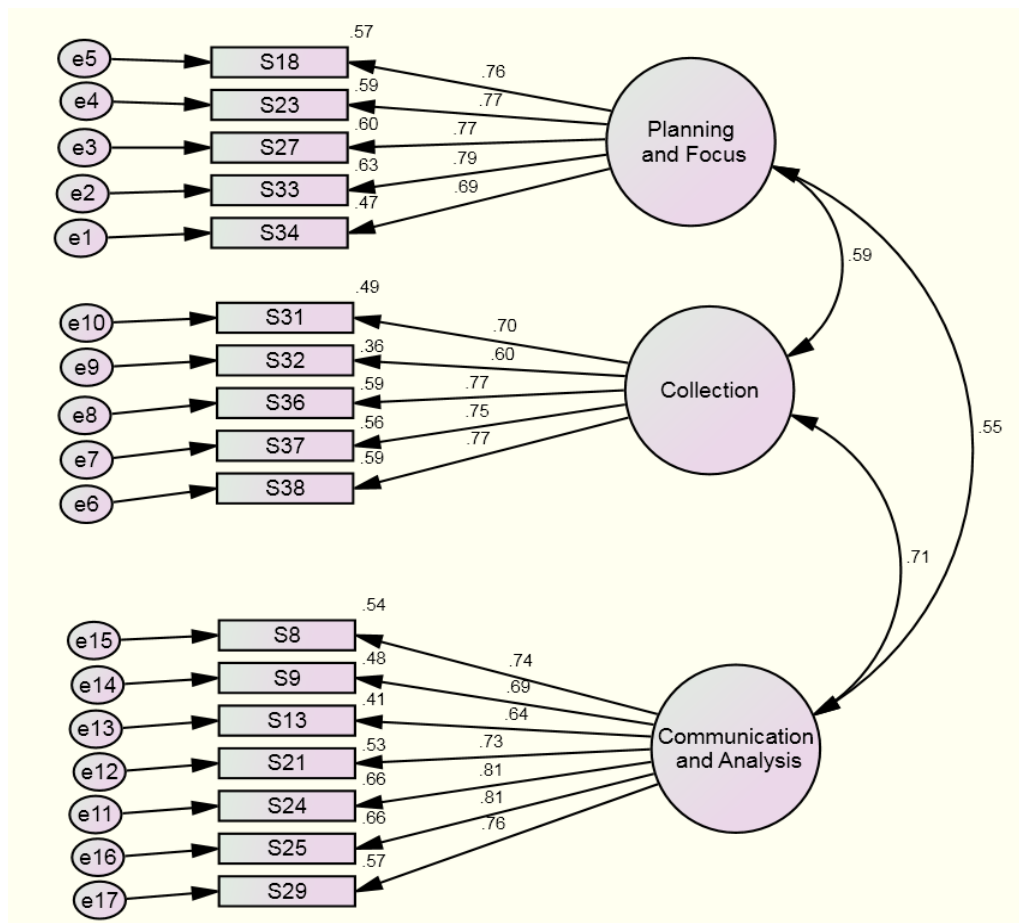


Figure 4.6: Output of Competitive Intelligence Process Model

4.4.2.4 Assessment of Measurement Model Validity

To evaluate the validity of the model, the researcher divides the output of the model into three parts, regression result; model fit indices and validity as shown in Figure 4-7.

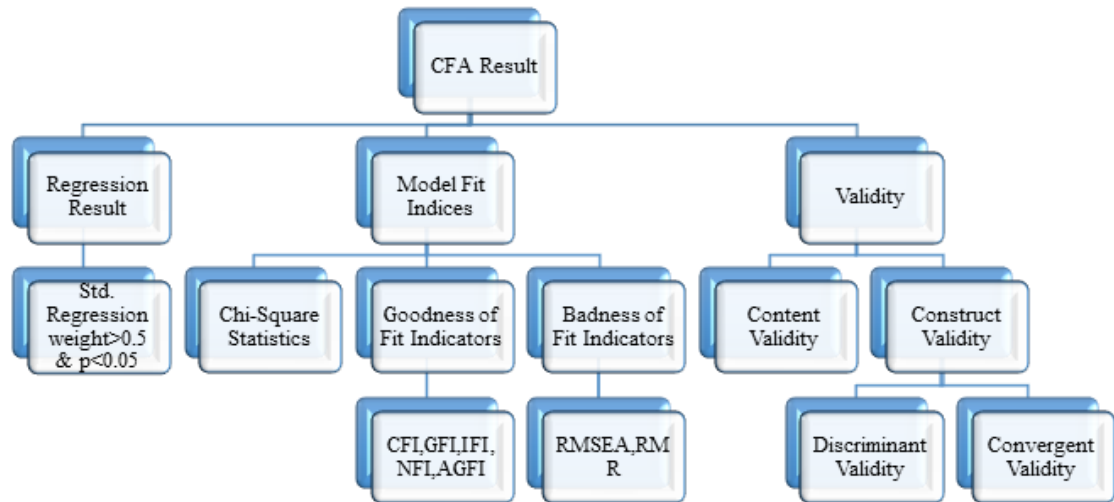


Figure 4.7: Divisions of CFA Output

Regression Result: The Regression weight of each statement is more than 0.5 and it is significant at 0.001 (Level of Significance, α). It shows that all three factors are explaining its statements significantly and no statement has been qualified for deletion as shown in Table 4-16 and Figure 4-6. The least standardized regression weight is 0.60 between S32 and the collection factor.

Table 4.16: Standardized Regression Weight for CI Process Model

			Estimate
S34	<---	Planning and Focus	.69
S33	<---	Planning and Focus	.79
S27	<---	Planning and Focus	.77
S23	<---	Planning and Focus	.77
S18	<---	Planning and Focus	.76
S38	<---	Collection	.77
S37	<---	Collection	.75
S36	<---	Collection	.77
S32	<---	Collection	.60
S31	<---	Collection	.70
S24	<---	Communication_ and Analysis	.81
S21	<---	Communication_ and Analysis	.73
S13	<---	Communication_ and Analysis	.64
S9	<---	Communication_ and Analysis	.69
S8	<---	Communication_ and Analysis	.74
S25	<---	Communication_ and Analysis	.81
S29	<---	Communication_ and Analysis	.76

Model Fit Indices:

Statistical Significance of Chi-Square (χ^2) Statistics: It assesses the overall model fit.

H_0 =There is no significant difference between the observed value and the expected value of the measured variable.

H_1 = There is a significant difference between the observed value and the expected value of the measured variable.

The null hypothesis shows that “The model is perfectly fit.” The overall model Chi-square $\chi^2 = 209.039$ ($p < 0.000$) with 116 degrees of freedom. If p value comes out to be more than 0.05 (level of significance) then the model is perfectly fit but, in this case, the model is not perfectly fit. “The mathematical properties of chi square goodness of fit test reduce the fit of a model for the things that should not be detrimental to its overall validity. So it is often used with other measures of fit.” (Hair, Black, Babin, & Anderson, 2015).

Absolute Fit Measure

In this category RMSEA is the most popular measure. It measures the badness-of-fit of the model, so it is good if it is less. “The values of RMSEA are 0.01, 0.05, and 0.08 to signify excellent, good, and mediocre fit, respectively.” (MacCallum, Browne, & Sugawara, 1996). However, it is acceptable up to 0.10 as per the cutoff for poor fitting models (Hair, Black, Babin, & Anderson, 2015). The value of the CI process model of RMSEA is 0.044 which is in the range of good model fit as shown in Table 4-18. “The value of Normed Chi-Square (CMIN/DF) is 1.802. The value of Normed Chi-Square less than 2.0 signify a very good model fit and between 2.0 to 5.0 is signify an acceptable model fit” (Hair, Black, Babin, & Anderson, 2015). Thus, the value of Normed χ^2 suggests a very good fit for CI Process Model, as shown in Table 4-17.

Table 4.17: CMIN (Normed Chi-Square) for CI Process Model

Model	NPAR	CMIN	DF	P	CMIN/DF
Default Model	37	209.04	116	.000	1.80
Saturated Model	153	.000	0		
Independence Model	17	2097.35	136	.000	15.42

Table 4.18: RMSEA for CI Process Model

Model	RMSEA	LO 90	HI 90	PCLOSE
Default Model	.044	.030	.058	.000
Independence Model	.262	.251	.273	.000

Incremental Fit Indices

The most commonly used index is CFI in the category of Incremental fit indices. “The value of CFI should be more than 0.95 for a good fit and it is acceptable up to 0.90. The value of CFI less than 0.90 is considered to be unacceptable” (Hair, Black, Babin, & Anderson, 2015). The Competitive Intelligence process model has CFI’s value of more than 0.95. The model is considered to be a good fit. The other indicators are also in the acceptable range as shown in Table 4-19.

Table 4.19: Baseline Comparisons Incremental Fit Indices

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default Model	.900	.883	.878	.944	.952
Saturated Model	1.000		1.000		1.000
Independence Model	.000	.000	.000	.000	.000

Summary of Model-Fit-Indices:

The summary of model-fit-indices is shown in Table 4.20. The output of CFA includes many goodness-of-fit indices which have been discussed. The fitness of the model should be judged on the basis of at least one absolute fit measure and one incremental fit measure. The value of RMSEA and CFA is 0.044(less than 0.05) and 0.953(more than 0.95) respectively; both are in the category of good model fit (Hair, Black, Babin, & Anderson, 2015). The GFI, AGFI and LISREL are influenced by

sample size. So it is recommended not to consider them for analyzing model fit (Sharma, Mukherjee, Kumar, & Dillon, 2005).

Table 4.20: Summary of Goodness-of-Fit Indices

Goodness of Fit Statistics	
Chi-Square (χ^2)	209.04(p=0.000)
Degree of Freedom	116
Absolute Fit Measure	
Normed Chi-Square(CMIN/DF)	1.802
RMSEA(Root Mean Square Error of Approximation)	0.044
90 percent confidence interval of RMSEA	(0.030,0.058)
RMR(Root Mean Square Residual)	0.078
Incremental Fit Indices	
NFI(Normed Fit Index)	0.900
CFI(Comparative Fit Index)	0.953
RFI(Relative Fit Index)	0.883

Construct Validity of the CI Process Model

The validity of a scale is referred to as “the degree to which a scale measures what it is supposed to measure” (Cooper, Schindler, & Sharma, 2012). Construct validity, “it is the degree of confidence that a set of measured statements signify the latent construct they are intended to measure” (Hair, Black, Babin, & Anderson, 2015). Campbell and Fiske (1959) recommended two aspects to measure the construct validity: first is convergent validity and second is discriminant validity. “Convergent validity is the degree of confidence that a construct is well measured by its measured variables. Discriminant validity is the degree of confidence that two latent constructs

are unrelated.” (Campbell & Fiske, 1959). Convergent validity is measured with the help of AVE and CR (Fornell & Larcker, 1981).

The regression’s results of model authenticate that all loading in the CI process model is very significant as essential for convergent validity. “The individual standardized loading should be at least 0.5” (Hair, Black, Babin, & Anderson, 2015). As shown in Table 4-16, the standardized loading for all the statements is more than 0.5. The minimum standardized loading in the model is 0.601 between S32 and Factor 2 (Collection).

Calculation of Average Variance Extracted (AVE) and Construct Reliability (CR).

Squared multiple correlations are the variance of the individual statement (dependent Variable) explained by the respective factor (Independent variable) as shown in Table 4-21 and Table 4-22. The AVE is the variance explained by the latent construct as compared to measurement error (Residuals). “The value of AVE more than 0.5 means good convergent validity of the latent constructs.” (Hair, Black, Babin, & Anderson, 2015). In the model of CI process, the average variance explained (AVE) for latent construct F1 (Planning and Focus), F2 (Collection) and F3(Communication and Analysis) is 0.577, 0.519 and 0.551 respectively. The model has AVE values for each latent construct is more than 0.5 as shown in Table 4-22.

Table 4.21: Squared Multiple Correlations of CI Process Model

	Estimate
S18	.574
S23	.587
S27	.596
S33	.629
S34	.474
S31	.487
S32	.361
S36	.588
S37	.564
S38	.592
S8	.541
S9	.476
S13	.414
S21	.530
S24	.662
S25	.659
S29	.572

Table 4.22: AVE Calculation of CI Process Model

Statements	F1(Planning and Focus)	F2(Collection)	F3(Communication and Analysis)
S18	.574		
S23	.587		
S27	.596		
S33	.629		
S34	.474		
S31		.487	
S32		.361	
S36		.588	
S37		.564	
S38		.592	
S8			.541
S9			.476
S13			.414
S21			.530
S24			.662
S25			.659
S29			.572
AVE	0.572	0.520	0.551
CR	0.869	0.843	0.895

The second measure for convergent validity is Construct Reliability (CR). It measures the internal consistency of the statements. “The value of CR above 0.7 shows very good convergent validity of the latent construct but it is also acceptable up to 0.5” (Hair, Black, Babin, & Anderson, 2015). In the model of CI process, the CR for latent construct F1 (Planning and Focus), F2 (Collection) and F3 (Communication and Analysis) are 0.869, 0.843 and 0.895 respectively. The model has CR values for each latent construct more than 0.7. The value of CR above 0.7 shows very good internal consistency. There is no convergent validity problem in the model as $AVE > 0.5$ and $CR > 0.7$ for each latent construct.

Discriminant Validity of the CI Process Model

It is the degree of confidence that two latent constructs are unrelated (Campbell & Fiske, 1959). If the correlation between two latent constructs is high, it means the model has poor discriminant validity. “The value of the correlation between the latent construct of more than 0.85 in absolute value indicates poor discriminant validity” (Kenny, 2015). As shown in Table 4-23 the correlation between latent constructs is not very high.

Table 4.23: Correlation between Latent Constructs

			Estimate
Planning_ and Focus	<-->	Collection	.59
Planning_ and Focus	<-->	Communication_ and Analysis	.55
Collection	<-->	Communication_ and Analysis	.71

The factors of the competitive intelligence process model have discriminant validity between its latent factor because AVE is more than MSV and ASV as showed in Table 4-24.

Table 4.24: Summary of Validity Measures for CI Process Model

	AVE	CR	MSV	ASV
Factor 1 Planning and Focus	0.572	0.869	0.348	0.325
Factor 2 Collection	0.520	0.843	0.500	0.423
Factor 3 Communication and Analysis	0.551	0.895	0.500	0.397

4.4.3 The Competitive Intelligence Context Model

Competitive intelligence capabilities of a firm consist of the CI process and CI context. The researcher has discussed the competitive intelligence process in the previous section. This section discusses the competitive intelligence context model. According to Saayman, et al., (2008) the competitive intelligence context model has four factors: “Awareness (F1), Internal Information (F2), Formal Infrastructure (F3) and Employee Involvement (F4).” The statements which define the factors are shown in Appendix-H. On the basis of the given statements and factors, the model has been built according to the output of previous researches. The input model for competitive intelligence context is shown in Figure 4-8.

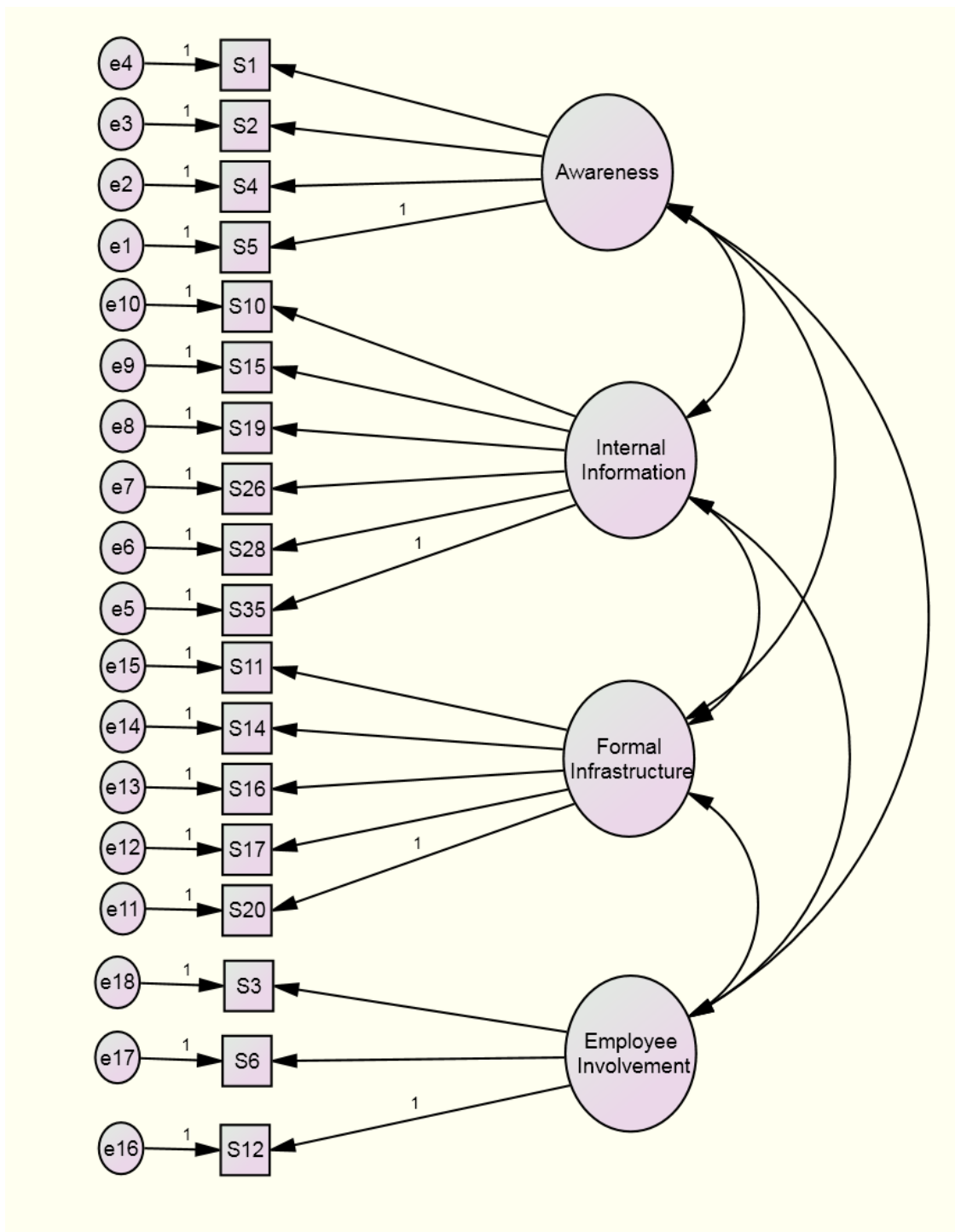


Figure 4.8: Competitive Intelligence Context Model

4.4.3.1 Designing Study to Produce Empirical Results

The design of the study has already been explained in chapter 3 in detail. The context model of competitive intelligence has four constructs and each has three or more than

three observed statements. The model has 18 observed variables so the total number of distinctive variance and covariance terms is

$$(18 \times 19)/2 = 171$$

The total number of estimated parameters is 22 (Variance of error terms and Latent variables) + 14 (Parameters are estimated for loading) + 6 (Unique covariance among construct) = 42

The model is identified because 171 are greater than 42 and DF (Degree of Freedom) of the model is 129 (171-42). This model is recursive.

The number of distinct sample moments = 171

A number of distinct parameters to be estimated = 42

Degree of Freedom (171-42) = 129

The standardized estimated output of the model is shown in Figure 4-9.

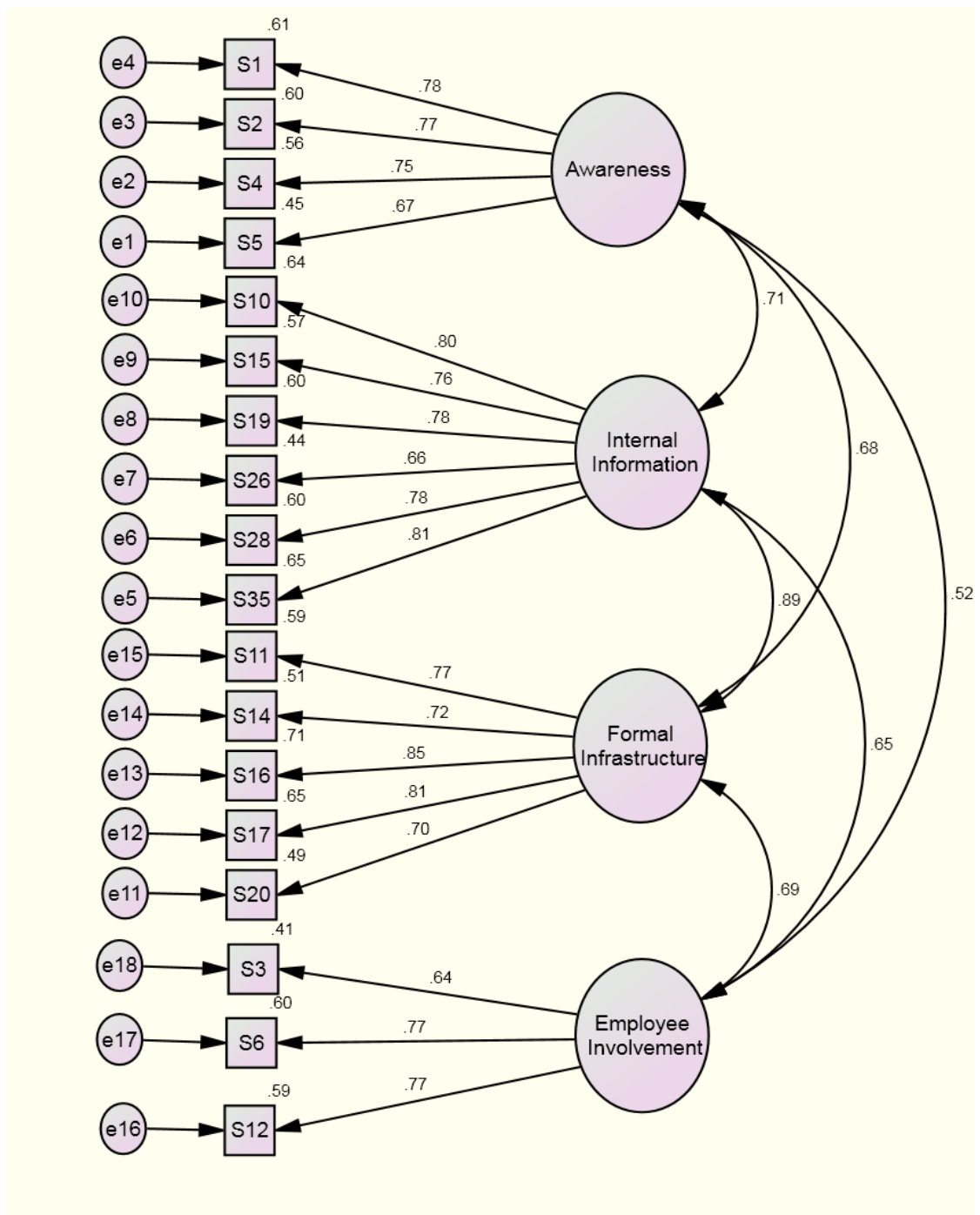


Figure 4.9: Output of Competitive Intelligence Context Model

4.4.3.2 Assessment Measurement Model Validity

To measure the validity of competitive intelligence context model, the researcher divides the output of confirmatory factor analysis into three parts: regression result; model fit indices and validity.

Regression Result: The unstandardized regression weight of factors in defining each statement is significant and a C.R (Critical Ratio) value for each statement is more than 2 and significant at 0.001(Level of Significance, α). It means each statement has a significant loading on the respective factor and no statement has been qualified for deletion.

The standardized regression weight of each statement is more than 0.5. It shows each statement is sufficiently predicted by its latent variable or factor. The least standardized regression weight is 0.632 between Employee Involvement (F4) and S3 (“Most employees understand what competitive intelligence is”) as shown in Table 4-25 and Figure 4-9.

Table 4.25: The Standardized Regression weight of CI Context Model

			Estimate
S5	<---	Awareness	.672
S4	<---	Awareness	.751
S2	<---	Awareness	.771
S1	<---	Awareness	.779
S35	<---	Internal_ Information	.805
S28	<---	Internal_ Information	.778
S26	<---	Internal_ Information	.662
S19	<---	Internal_ Information	.776
S15	<---	Internal_ Information	.757
S10	<---	Internal_ Information	.802
S20	<---	Formal_ Infrastructure	.702
S17	<---	Formal_ Infrastructure	.805
S16	<---	Formal_ Infrastructure	.845
S14	<---	Formal_ Infrastructure	.717
S11	<---	Formal_ Infrastructure	.770
S12	<---	Employee_ Involvement	.767
S6	<---	Employee_ Involvement	.774
S3	<---	Employee_ Involvement	.639

Model Fit Indices:

Statistical Significance of Chi-Square (χ^2) Statistics: It assesses the overall model fit.

The null hypothesis in this case is

H_0 =There is no significant difference between the observed value and the expected value of the measured variable.

H_1 = There is a significant difference between the observed value and the expected value of the measured variable.

The null hypothesis shows that “the model is perfectly fit”. The overall model has Chi-square $\chi^2 = 331.099$ ($p < 0.000$) with 129 degrees of freedom. “The mathematical properties of χ^2 test decrease the fit of a model for the things that should not be detrimental to its overall validity so it is often used with other measures of fit” (Hair, Black, Babin, & Anderson, 2015).

Absolute Fit Measure:

In this category RMSEA is the most popular measure. It measures the badness-of-fit of the model. So it is good if it is less. In the model of CI context, the value of RMSEA is 0.0632 which is in the range of good model fit (Hair, Black, Babin, & Anderson, 2015). The value of Normed Chi-Square (CMIN/DF) is 1.667. Thus, the Normed χ^2 suggests a good model fit for CI Context Model, as shown in Table 4-26.

Table 4.26: Normed Chi-Square (CMIN/DF) For CI Context Model

Model	NPAR	CMIN	DF	P	CMIN/DF
Default Model	42	215.30	129	.000	1.667
Saturated Model	171	.000	0		
Independence Model	18	1935.19	153	.000	12.65

Incremental Fit Indices:

The most commonly used index is CFI in the category of Incremental fit indices. “The value of CFI should be more than 0.95 for good fit and it is acceptable up to 0.90, the value of CFI less than 0.90 is signified an unacceptable model” (Hair, Black, Babin, & Anderson, 2015). The Competitive Intelligence context model has CFI’s value of more than 0.95. The model is a good fit. The other indicators are also in the acceptable range as shown in Table 4-27.

Table 4.27: Baseline Comparison of CI Context Model

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default Model	.889	.868	.897	.942	.952
Saturated Model	1.000		1.000		1.000
Independence Model	.000	.000	.000	.000	.000

Summary of Model-Fit-Indices:

The summary of model-fit-indices is shown in Table 4-28. The value of RMSEA and CFI is 0.069(less than 0.08) and 0.953(more than 0.95) respectively both are in the category of good model fit(Hair, Black, Babin, & Anderson, 2015).

Table 4.28: Summary of Goodness-of-fit Indices of CI Context Model

Goodness of Fit Statistics	
Chi-Square(χ^2)	331.03 (p = 0.000)
Degree of Freedom	129
Absolute Fit Measure	
Normed Chi-Square(CMIN/DF)	1.667
RMSEA	0.063
Root Mean Square Residual(RMR)	.078
Incremental Fit Indices	
Normed Fit Index(NFI)	0.889
Comparative Fit Index(CFI)	0.951
Relative Fit Index(RFI)	0.868

The convergent validity is measured through Average Variance Extracted (AVE) and Construct Reliability (CR). (Fornell & Larcker, 1981).

The results of standardized regression weight authenticate that all loading in CI context model is very significant as essential for convergent validity. “The individual Standardized loading should be at least 0.5” (Hair, Black, Babin, & Anderson, 2015).

Calculation of AVE and CR

Squared multiple correlations are the variance of the individual statement which is explained by the respective latent factor as shown in Table 4-29. The AVE is the variance explained by the latent construct as compared to Residuals. “The value of AVE more than 0.5 signifies a good convergent validity of the latent constructs.” (Hair, Black, Babin, & Anderson, 2015). In the model of CI context, the AVE for latent construct F1 (Awareness), F2 (Internal Information), F3 (Formal Infrastructure) and F4 (Employee Involvement) is 0.55, 0.58, 0.60 and 0.53 respectively. The model has AVE values for each latent construct is more than 0.5.

Table 4.29: AVE and CR Calculation of CI Context Model

Statement	Awareness(F1)	Internal Information(F2)	Formal Infrastructure(F3)	Employee Involvement(F4)
S1	0.61			
S2	0.59			
S4	0.56			
S5	0.45			
S10		0.64		
S15		0.58		
S19		0.61		
S26		0.44		
S28		0.61		
S35		0.66		
S11			0.59	
S14			0.52	
S16			0.72	
S17			0.66	
S20			0.49	
S3				0.41
S6				0.59
S12				0.59
AVE	0.55	0.58	0.60	0.53
CR	0.83	0.90	0.88	0.77

The second measure for convergent validity is Construct Reliability (CR). It measures the internal consistency of the statements. In the model of CI context, the CR for latent construct F1 (Awareness), F2 (Internal information), F3 (Formal infrastructure) and F4(Employee involvement) is 0.83, 0.90, 0.88 and 0.77 respectively. The model has CR values for each latent construct which are more than 0.7. The value of CR above 0.7 shows excellent internal consistency.

Table 4.30: Summary of Validity Measures for CI Context Model

	AVE	CR	MSV	ASV
Factor1 Awareness	0.553	0.832	0.504	0.435
Factor 2 Internal Information	0.587	0.895	0.792	0.563
Factor 3 Formal Infrastructure	0.596	0.881	0.792	0.568
Factor 4Employee involvement	0.530	0.772	0.477	0.384

Discriminant Validity of the CI Context Model

It is the degree of confidence that two latent constructs are unrelated (Campbell & Fiske, 1959). If the correlation between two latent constructs is high, it shows the latent constructs in the model has poor discriminant validity. The value of the correlation between the latent construct of more than 0.85 in absolute value indicates poor discriminant validity (Kenny, 2015).

Table 4.31: Correlations between Factors of CI Context Model

	Awareness	Internal Information	Formal Infrastructure	Employee Involvement
Awareness	-	0.708	0.685	0.523
Internal Information	0.708	-	0.890	0.655
Formal Infrastructure	0.685	0.890	-	0.689
Employee Involvement	0.523	0.655	0.689	-

In the model of CI context F2 (Internal Information) and F3 (Formal Infrastructure) are weak on the discriminate validity so they are not two different constructs but one construct. This model has three constructs: first is Awareness (F1), second is the combination of Internal Information (F2) and Formal Infrastructure (F3) and third is Employee Involvement (F4).

4.5 Status of Competitive Intelligence in Indian Retail Industry

To analyze the current status of competitive intelligence in the Indian Retail Industry, competitive intelligence construct has been studied according to Calof and Dishman's model of CI. According to this model Competitive Intelligence construct has two parts: Competitive Intelligence Process and Competitive Intelligence Context.

4.5.1 Competitive Intelligence Process in Indian Retail Industry

The output of confirmatory factor analysis confirms that the Indian retail industry has three phases of Competitive Intelligence process: Planning and Focus, Collection and Communication and Analysis. The overall performance of Indian retail firms on these phases has been investigated by analyzing the total sum score of the firm in the respective phase. If the average score of the firms is more than 75 % of the total sum score of the factor, it means that firms are practising an advanced level of Competitive Intelligence in the respective factor. If the average score of the firms is more than 50% of the total score of the factor it means firms are practising intermediate level. If the average score is less than 50% of the total score of the factor it means firms are practising a basic level of competitive intelligence in that particular factor.

4.5.1.1 Factor 1: Planning and Focus

This factor consists of five statements which are measured on five points Likert scale. All five statements are positive. So there is no need to reverse the coding of statements. The total possible sum score in Planning and Focus construct is 25. As shown in Table 4-32. Indian Retail firms have a mean score of 15.30. It is 61.2% of the total score. The mean score of firms on Planning and Focus is more than 50% of the total score. So Indian Retail firms are practising an intermediate level of Planning and Focus.

4.5.1.2 Factor 2: Collection

This factor consists of five statements. All five statements are positive so there is no need to reverse the coding of statements. The total possible sum score in Collection construct is 25. As shown in Table 4-32. Indian Retail firms have a mean score of 15.85. It is 63.4% of the total score. The mean score of Indian Retail firms on Collection factor is more than 50% and less than 75% of the total score. So Indian Retail firms are practising an intermediate level of collection.

4.5.1.3 Factor 3: Communication and Analysis

This factor consists of seven statements. All five statements are positive so there is no need to reverse the coding of statements. The total possible sum score in Communication and Analysis construct is 35. As shown in Table 4-32. Indian Retail firms have a mean score of 25.29. It is 72.3% of the total possible sum score. The mean score of Indian Retail firms on Communication and Analysis factor is more than 50% and less than 75% of the total sum score. So Indian Retail firms are practising an intermediate level of Communication and Analysis.

Indian retail firms in terms of following the competitive intelligence process are categorized as practitioners of the intermediate level of competitive intelligence. In the comparison of three factors, Indian firms are comparatively good in Communication and Analysis and weak in Planning and Focus as shown in Table 4-32.

Table 4.32: Descriptive Statistics of Latent Factors of CI Process

	N	Minimum	Maximum	Mean	Std. Deviation
Planning and Focus	168	5.00	23.00	15.30	4.05
Collection	168	5.00	25.00	15.85	4.16
Communication and Analysis	168	11.00	33.00	25.29	5.69

4.5.2 Competitive Intelligence Context in Indian Retail Industry

Competitive Intelligence context consists of four factors: Awareness, Internal Information, Formal Infrastructure and Employee Involvement. The output of confirmatory factor analysis shows that the Indian retail industry has three factors in Competitive Intelligence context. It does not have four factors as given by Calof and Dishman's model of CI. Indian retail firms do not differentiate between Internal Information and Formal Infrastructure. Indian Retail industry has the following three factors: Awareness, Internal Information and Formal Infrastructure, and Employee Involvement.

The overall performance of firms on these factors is investigated on the bases of the mean score and total score on the respective factor. If the mean score of the firms is more than 75 % of the total score of the factor, it means that firms are practising

advance level of Competitive Intelligence in the respective factor. If the mean score of the firms is more than 50% of the total score of a particular factor it means firms are practising intermediate level. If the mean score is less than 50% of the total score of a particular factor it means firms are practicing a basic level of competitive intelligence in a particular factor.

4.5.2.1 Factor 1: Awareness

This factor consists of four statements which are measured on five points likert scale. All four statements are positive so there is no need to reverse the coding of statements. The total possible sum score in Awareness construct is 20. Indian Retail firms have a mean score of 16.39. It is 81.95% of the total sum score. The mean score of firms on Awareness is more than 75% of the total score. So Indian Retail firms have an advance level of Awareness. As shown in Table 4-33.

4.5.2.2 Factor 2: Internal Information and Formal Infrastructure

Indian retail firms do not differentiate between Internal Information and Formal Infrastructure. This combined factor has eleven statements. The total possible sum score is 55. The mean score of the firms comes out to be 35.5. It is 64.5 % of the total sum score. The mean score of Internal Information and Formal Infrastructure is more than 50% of the total score. So Indian Retail firms have an intermediate level of Internal Information and Formal Infrastructure. As shown in Table 4-33.

4.5.2.3 Factor 3: Employee Involvement

This factor consists of three statements which are measured on five points likert scale. All three statements are positive so that there is no need to reverse the coding of statements.

The total possible score in Employee Involvement construct is 15. Indian Retail firms have a mean score of 9.58. It is 63.98% of the total score. The mean score of firms on Employee Involvement is more than 50% of the total sum score. So Indian Retail firms have an intermediate level of Employee Involvement. As shown in Table 4-33.

Indian retail firms in terms of competitive intelligence context have an advanced level of Awareness, intermediate level of Internal Information and Formal Infrastructure, and Employee Involvement.

Table 4.33: Descriptive Statistics of Latent Factors of CI Context

	N	Minimum	Maximum	Mean	Std. Deviation
Awareness	168	7.00	20.00	16.39	2.95
Internal Information and Formal Infrastructure	168	12.00	51.00	35.54	4.16
Employee involvement	168	4.00	14.00	9.58	2.52

4.6 Competitive Intelligence and Strategy Formulation

To investigate the role of CI in strategy formulation of Indian Retail Industry, information has been collected on two parameters: the importance of CI and frequency of use of CI in strategic decision making.

4.6.1 Importance of Competitive Intelligence in Strategy Formulation

The question was asked “How important to your organisation is the use of CI for the following purposes/roles?” The importance of competitive intelligence is measured on the following seven parameters: “supporting strategic decision making, identifying early warning for threats, identifying blind spots and opportunities, supporting competitor assessment and tracking, performing industrial benchmarking, supporting

strategic planning and implementation” on a five-point scale from very unimportant to very important. The mean score of each parameter is more than 4 except supporting strategic planning and implementation. As shown in Table 4-34 the importance of CI in all the purposes/roles has high means which is between important to very important. The Indian retail industry gives importance to competitive intelligence in decision making.

Table 4.34: Descriptive Statistics of Importance of CI in Strategic Decision Making

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Supporting strategic decision making	168	2.00	5.00	4.26	.73
Identifying early warning for threats	168	1.00	5.00	4.21	.78
Identifying blind spots and opportunities	168	1.00	5.00	4.18	.75
Supporting competitor assessment and tracking	168	1.00	5.00	4.11	.80
Performing industrial benchmarking	168	1.00	5.00	4.10	.80
Performing counterintelligence	168	1.00	5.00	4.02	.80
Supporting strategic planning and implementation	168	1.00	5.00	3.96	.80

The mean score of the Importance of CI is 28.85. It is 82.43% of the total possible sum score of 35. The mean score of the importance of competitive intelligence is

shown in Table 4-34. It is more than 75% of the total score so it is in the advanced category. Indian retail firms give importance to the use of competitive intelligence for decision making.

4.6.2 Frequency of Competitive Intelligence Used in Strategy Formulation

The question was asked, “How frequently do you use CI in the following strategic decision making activities?” The frequency of competitive intelligence used in strategic decisions is measured on the following eleven strategic decisions: “merger and acquisition, strategic alliance and joint venture, market entry/exit, vertical integration, capacity expansion, new product/service development, diversification, divestment, technology adoption, global, and organisational”. The frequency of use of CI in strategic decisions was measured with a five-point scale from never (1) to always (5).

As shown in Table 4-35 the mean score of the frequency of CI used in strategic decisions is not more than 4 in any decision. The three decisions include strategic alliance, organization and technology adoption have a mean score of less than three. The less mean score shows that the use of competitive intelligence for strategic decision making is low.

Table 4.35: Descriptive Statistics of the Frequency of CI used in Strategic Decisions

	Number of Cases	Minimum	Maximum	Mean	SD
New product/service development	168	1.00	5.00	3.90	.96
Merger & acquisition	168	1.00	5.00	3.81	.92
Capacity expansion	168	1.00	5.00	3.76	.94
Diversification	168	1.00	5.00	3.70	.95
Vertical integration	168	1.00	5.00	3.57	.99
Market entry/exit	168	1.00	5.00	3.43	.96
Global	168	1.00	5.00	3.11	.93
Divestment	168	1.00	5.00	3.05	1.04
Strategic alliance	168	1.00	5.00	2.98	.91
Organisation	168	1.00	5.00	2.66	.97
Technology adoption	168	1.00	5.00	2.30	.99
Valid N (listwise)	168				

The total mean score of the frequency of CI used in strategic decisions is 36.26. It is 65.93% of the total possible sum score of 55. The mean score of the frequency of competitive intelligence used in strategic decisions is shown in Table 4-36. The mean score of the frequency of competitive intelligence used in strategic decisions importance is more than 50% of the total sum score. So it is in the intermediate category.

Table 4.36: Descriptive Statistics of the Strategic Role of Competitive Intelligence

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Total Score of Importance of CI	168	10.00	35.00	28.85	3.88
Total Score of strategic use of CI	168	11.00	55.00	36.26	6.88
Valid N (listwise)	168				

4.7 Competitive Intelligence and Business Performance

The relationship means some form of union or association between variables. “There are various types of statistical relationships which can exist among variables in social science. The relationship may be causal relation so that when one variable changes, this causes changes in another variable. Another relationship among variables is no less real, but the causal nature of the connection may be obscure or unknown. Variables may be related statistically, even though there is no causal relation between variables”. The relationship between competitive intelligence and business performance is investigated through the use of the Chi-square test of independence. It investigates whether the observed frequency of variables is high enough to show that the two variables are dependent on each other or not.

4.7.1 Competitive Intelligence

Competitive Intelligence capability of a firm is the sum of the competitive intelligence process score and competitive intelligence context score of the firm. There are 17 statements in the competitive intelligence process and 18 statements in competitive intelligence construct measured on the five-point scale so the total possible score is 175. The mean score of competitive intelligence capability of Indian Retail firms is 121.89 with a standard deviation of 22.97 as shown in Table 4-37. The competitive intelligence capability of firms is measured on the basis of the total sum score of competitive intelligence.

Table 4.37: Descriptive Statistics of Business Performance and CI Construct

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Total Score of Business Performance	168	19.00	40.00	32.54	3.91
Addition of Process and Context	168	49.00	162.00	121.89	22.97
Valid N (listwise)	168				

The firms are categorized in to the three following categories

High – Firms which have competitive intelligence capability score more than 75% of the total possible sum score of 175. It means firms which have total sum scored on statements more than or equal to 131 considered being in the high category. The number of firms which falls in this category is 74 as shown in Table 4-37.

Medium - Firms which have competitive intelligence capability sum score more than 50% of the total possible sum score of 175. It means firms which have total sum scored equal to or more than 88 and less than 131 are considered to be in the medium category. The number of firms which falls in this category is 74 as shown in Table 4-37.

Low-Firms which have competitive intelligence capability sum score less than 50% of the total possible sum score of 175. It means firms which have total sum scored less than 88 are considered to be in a low category. The number of firms which falls in this category is 20 as shown in Table 4-38.

Table 4.38: Three Categories of Firms on the Basis of CI Score

Three Categories of Competitive Intelligence					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High	74	44.0	44.0	44.0
	Medium	74	44.0	44.0	88.1
	Low	20	11.9	11.9	100.0
	Total	168	100.0	100.0	

4.7.2 Business Performance

The eight parameters include “Total Sales, Return on Investment, Market Share, Return on Assets, Gross Margin, Revenue Growth, and Sales per Employee and Sales per Square Foot have been selected by vote count method”. The selected parameters were subjectively evaluated on a five point Likert scale from very low impact to very high impact. The question was asked how the introduction of Competitive Intelligence impacts the business performance of your organisation as compared to previous performance (Prior to the introduction of Competitive Intelligence). Please indicate on a scale from 1 to 5, where 1 very low impact and 5 equals very high impact.

The mean score of business performance is 32.54 with a standard deviation of 3.91. It is 81.35% of the total possible score of business performance construct. It means firms believe that their performance has been improved after implementation of Competitive Intelligence as shown in Table 4-39.

Table 4.39: Descriptive Statistics of Business Performance

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Total Score of Business Performance	168	19	40	32.54	3.91
Valid N (listwise)	168				

The firms are divided on the basis of Business Performance score. The firms which have scored more than or equal to 75% of the total score are considered as High Performance firms and others are Low Performance firms as shown in Table 4-40. There are 135 firms out of 168 which are categorized as high performance firms and 33 are categorized as low performance firms.

Table 4.40: Frequency Table of Firms on the Basis of Business Performance

Two Categories of Business Performance					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High 30-40	135	80.4	80.4	80.4
	Less than 30	33	19.6	19.6	100.0
	Total	168	100.0	100.0	

4.7.3 Chi-Square Test of Independence

The Chi-Square test of independence is applied between two variables Competitive Intelligence capability and Business Performance, the hypotheses are

H_0 : There exists No relationship between Competitive Intelligence Capability and Business Performance.

H_1 : There exists a relationship between Competitive Intelligence Capability and Business Performance.

In terms of independence and dependence, these hypotheses could be stated

H_0 : Competitive Intelligence Capability and Business Performance are independent.

H_1 : Competitive Intelligence Capability and Business Performance are dependent.

Assumptions of Chi-Square test of Independence: The sample observations have to be Independent; all expected counts have to be greater than one and not more than 20% of cells with an expected count of less than five. All these assumptions are fulfilled in the research as shown in Table 4-41.

Table 4.41: Contingency Table of Chi-Square Test of Independence

		Two Categories of Business Performance	
		High	Low
Three Categories of Competitive Intelligence	High	68	6
	Medium	60	14
	Low	7	13

Table 4.42: Pearson Chi-Square Tests

		Two Categories of Business Performance	
		Three Categories of Competitive Intelligence	Chi-square
df	2		
Sig.	.000*		

*. The Chi-square statistic is significant at the 0.05 level.

The p -value (labeled Sig.) of Chi-square test is less than 0.05 as shown in Table 4-42. “It means competitive intelligence capability and business performance are not independent of each other and there is a statistical relationship between competitive intelligence capability and business performance. It means companies which have a high score in competitive intelligence capabilities have a high score on performance and companies who have a low score in competitive intelligence capabilities have a low score on performance”.

The six companies which were high on competitive intelligence capabilities but low on performance consists of two Apparel, two are fashion and one departmental store and one furniture retail sector firms. As shown in table 4.42.

Table 4.42: Companies have high competitive intelligence capabilities with low business performance

Company	Sector	CI_category	CI_Score	BP_Category	BP_Score
R Trends	Apparel	1	132	2	26
BGS	Fashion	1	134	2	23
Michel kors	Fashion	1	135	2	29
Store99	Departmental Store	1	134	2	29
Zodiac	Apparel	1	132	2	29
Stroika	Furniture Retail	1	134	2	29

The seven companies which were low on competitive intelligence capabilities but high on performance consists of two Apparel, one pharma retail, one home interior products, one food & beverages, one gift retail and one Jewellery retail sector firms as shown in table 4.43.

Table 4.43: Companies have low competitive intelligence capabilities with high business performance

Company	Sector	CI_category	CI_Score	BP_Category	BP_Score
Sanjivani	Pharma Retail	3	79	1	37
Gokaldas	Apparel	3	86	1	36
Pure	Home Interior Products	3	82	1	33
Indian Kitchen	Food & Beverages	3	58	1	36
Divniti	Gift Retail	3	71	1	32
Gitanjali	Jewellery	3	85	1	36
Studio firang	Apparel	3	73	1	31