Chapter 5
Methodology

Literature Study	**Internet Services** **The Marketing of Services** **Relationship Marketing** **Interrelationships between constructs**
Methodology	**Survey and Analysis**
Qualitative Findings	Visualisation of Internet Service provision Service breakpoints (Fail Points)
Quantitative Findings	SERVQUAL Interrelationships between constructs
Recommendations	Defining a portfolio of projects
	Academic recommendations

In this chapter the following elements will be covered in order to cover the methodology used in fulfilling the objectives stated within the problem statement in Chapter 1:

(1) The Instrument used – the Internet based questionnaire used for the survey is discussed.
(2) The measurement questions used within the questionnaire are stated.
(3) Feedback obtained through executive interviews is briefly cited.
(4) Sample selection for and collection of the survey is described.
(5) A literature overview of multivariate analysis is given.
(6) Different methods within the realm of multivariate analysis is discussed – multiple regression, factor analysis and structural equation modelling.
(7) The scope and methods used for each of the objectives cited in the problem statement stated in Chapter 1 is covered and hypothesis set.
(8) Key terminology is covered to assist in the interpretation of findings in Chapter 6.

5.1. Instrument used

The instrument used in this study was an Internet based questionnaire. The Internet was used as a research vehicle, similar to telephone and other interactive survey methods. The questionnaire was hosted on a web site/ server. This allows fairly complex interactivity, help facilities and skip procedures. Respondents were lured to the site by an e-mail message requesting them to go to the survey site.

The full population of Intekom subscribers has access to the Internet and to an e-mail box. This allowed for the Internet to be used a primary research vehicle.

The advantages of using online research:

(1) High levels of interactivity. It was possible to alert respondents to mistakes that they have made in completing the questionnaire as well as questions skipped.
(2) Control can be more efficient since it is possible to integrate control procedures with the server architecture. The server verified certain user characteristics/identification codes interactively while the respondent logs onto the questionnaire. Respondents could only log onto the questionnaire if they were invited to do so.
(3) The questionnaire was adjusted on the spur of the moment. After a pilot survey of 100 respondents, the questionnaire layout was changed in a matter of minutes.
(4) The session variables of the respondents completion of the questionnaire could be monitored very closely, for instance the time spent on a specific question. Questions that the respondents completed in unrealistically short timeframes such as a section of 27 question in fewer than three minutes were dropped from the analysis.
(5) Data was immediately available, for analysis. Responses could be tracked in and if any problems were picked up during the pilot analysis the main mail-shot instrument could be changed or cancelled (Venter and Prinsloo, 1999).

Disadvantages in using Internet based research instrument for this study:

(1) The respondent pays for the telephone connection (local charges in South Africa).
(2) The time spent to complete the questionnaire is reliant on the quality of the connection to the Internet (Venter and Prinsloo, 1999).

5.2. Measurement questions

In this study, Ratio scales were used. Ratio scales represent the highest form of measurement precision, because they possess the advantages of all lower scales plus an absolute zero point. All mathematical operations are permissible with ratio scale measurements. The bathroom scale or other common weighting machines are examples of these scales, for they have an absolute zero point and can be spoken of in terms of multiples when relating to one point on the scale to another; for example, 100 pounds is twice as heavy as 50 pounds (Hair, Anderson, Tathim and Black, 1995:8).

The questionnaire was first e-mailed to 75 staff members of Intekom in order to get feedback on the design. Changes were effected and another 100

questionnaires were e-mailed to a pilot subscriber sample drawn from the Intekom database. Telephonic interviews were held with 42 of these respondents to get feedback on questionnaire design, ease of use and understanding. The questionnaire was then finalised and approved for distribution by Intekom management.

Methods used in the qualitative phase:

(1) Six management interviews of one hour each.
(2) Two customer support desk focus groups of two hours each.
(3) Five service blueprint workshops with key individuals of one hour each.
(4) One subscriber focus group of three hours.

The outputs from these interviews and focus groups were used in the blueprinting exercise and questionnaire development.

In addition to the blueprinting and questionnaire development the following useful feedback was obtained from Intekom management:

(1) It is important to 'touch' the customer as often as possible, communication is the basis for relationship building.
(2) The history of customer interactions with the ISP must be at the fingertips of client facing personnel.
(3) Employees within the ISP must be treated like adults, they in turn will then treat customers as adults, and this should lead to higher levels of customer satisfaction.
(4) Employees must be empowered to make decisions in order to satisfy the needs of subscribers.
(5) The customer is the best new product developer that an ISP can ask for, they are not bound by system constraints and pre-conceived viability judgements. It is important to welcome and listen to new product ideas coming from customers.
(6) Mass customisation of communication content is an important driver of the service experience.
(7) Communities need to be built around unique content that the ISP owns, for example if the ISP held rights to a propriety business directory service.
(8) Employees need to be incentivised if they overcome fail-points.
(9) Value added services are an important driver of service quality.

Table 5.1. Questions used in the qualitative investigation

Question	Input field
Have you experienced any problems with Intekom's service in the past six months?	Yes/No
If YES, please specify	Open
If you answered YES to the previous question, was the problem resolved	Yes/No

to your satisfaction?	
If NO, please specify	Open

Questions used in the empirical investigation:

Service quality questions:
The SERVQUAL scale was developed for assessing customer perceptions of service quality in service and retailing organisations. It is a quantitative questionnaire which consists of two parts, asking customer's opinions towards a particular service (expected quality) and that towards a particular firm (perceived quality). A set of 22 statements is applied in each part, to allow comparisons between expectation and perception. Each statement is a 10-point scale ranging from 'strongly agree' to 'strongly disagree'. For instance, respondents are asked to give a score to the following statement: 'Courier services should have up to date equipment.' These statements are grouped into five essential dimensions, though it is not explicitly expressed in the questionnaire (LOGIC web-site,1997).

Several single item measures used in previous research to investigate the nomological validity of SERVQUAL were included in the questionnaire. These items were designed to investigate whether subjects would consider the company first if they were seeking additional services, whether subjects would recommend the company to a friend, and whether they had ever reported a problem with it. The argument for these items is that those who perceive higher service quality for a particular service should be more willing to go there first, to recommend it to a friend, and more likely never to have reported a problem with it (Brown, Gilbert and Peter, 1993).

The skeleton may be adapted or supplemented to fit the characteristics or specific research needs of a particular organisation (LOGIC web-site, 1997).

(Attached questionnaire in the appendix for more detail and instructions to the questionnaire)

Table 5.2. Core service quality questions.

Question	Input field
The speed of your Internet connection	Ratio scale
The reliability of the connection (e.g. not dropping the line)	Ratio scale
The availability of a connection (e.g. line availability)	Ratio scale

Table 5.3. Tangibility questions.

Question	Input field
Technologically advanced Infrastructure	Ratio scale
Customer friendliness of the Internet Service Provider	Ratio scale

Visually pleasing materials associated with the products and services (e.g. promotional material, manuals and brochures, aesthetically pleasing marketing material)	Ratio scale

Table 5.4. Reliability questions.

Question	Input field
When promising to do something, the ISP does so (e.g. returning calls, arrival at training sessions, delivery of material, appointments, activation of services)	Ratio scale
When customers have a problem, the ISP shows a sincere interest in solving it (e.g. complaints, technical problems)	Ratio scale
Carrying out all services correctly the first time (configuration, support services, enhancements)	Ratio scale
Providing the service at the promised time (e.g. follow-up of enquiry's, fax back of application responses and account activation information fax)	Ratio scale
Providing error free documentation (e.g. keeping records, Internet explorer setup instructions)	Ratio scale
Keeping customers informed about when services will be performed (e.g. delivery, invoicing, follow-up, maintenance and enhancements)	Ratio scale

Table 5.5. Responsiveness questions.

Question	Input field
Prompt service to customers (e.g. setting up appointments, returning calls, resolving problems)	Ratio scale
Willingness to help customers (e.g. to answer questions, technical assistance, providing information)	Ratio scale
Readiness to respond to customer's requests (e.g. response to complaints, help and assistance.)	Ratio scale

Table 5.6. Assurance questions.

Question	Input field
The attitude and behaviour of employees that instils confidence in customers	Ratio scale
Customers that feel secure in their involvement (e.g. can trust them)	Ratio scale
Ensuring that problems are resolved above expectation(doing it 'very right' the second time)	Ratio scale
Employees that are always courteous with customers (e.g. good telephone manners, handling customers with respect, showing consideration)	Ratio scale
Being a credible Internet Service Provider (e.g. trustworthiness, integrity and honesty, name and reputation)	Ratio scale
Employees that have the knowledge to answer customer's questions (e.g. knowledge and skill of personnel, providing	Ratio scale

general information on day-to-day issues)	

Table 5.7. Empathy questions.

Question	Input field
Always being approachable (e.g. easy access to management, prompt telephone access, ease of contact)	Ratio scale
Treating customers with empathy (e.g. treat customers with dignity, demonstrating understanding with complaints, guarding against confrontation)	Ratio scale
Keeping customers informed and listening to them (e.g. supplying information on technological advancements, attentive to changing customer needs)	Ratio scale
Providing personal attention (e.g. acknowledgement of customer dislikes, support during problems)	Ratio scale
Have customer's best interests at heart (e.g. building long-term relationships)	Ratio scale
Understanding the specific needs of customers (e.g. assessment of customer requirements)	Ratio scale

Table 5.8. Customer satisfaction question.

Question	Input field
Please indicate your overall perception of INTEKOM compared to other ISPs, Content Providers and/or Internet Companies.	Ratio scale

Table 5.9. Internet satisfaction questions.

Question	Input field
Please indicate your overall satisfaction with each product or service that you have used:	
Communicating on the Internet e.g. sending e-mail and or using chat programs	Ratio scale
Surfing the Internet e.g. clicking on links, searching for information	Ratio scale
Transacting on the Internet e.g. buying goods/services through the Internet and/or doing home banking	Ratio scale

Table 5.10. Relationship quality questions.

Question	Input field
How would you rate the overall quality of your relationship with Intekom?	Ratio scale
Taking all things into consideration, if you were in the situation to reconsider your relationship with Intekom, how likely would you be to continue your relationship with them?	Ratio scale
Based on your experience with Intekom, how likely are you to continue using the services that you are currently using?	Ratio scale

Based on your experience with Intekom, how likely would you be to use/buy additional services from Intekom in the future?	Ratio scale
If things stayed the same as it is with Intekom and a friend, colleague or acquaintances asked you to recommend a company for Internet services, how likely would you recommend Intekom?	Ratio scale

Table 5.11. Value-added services questions.

Question	Input field
Please indicate your overall satisfaction with each product or service that you have used.	
E-mail	Ratio scale
5Mb free personal webspace (personal WebPages created)	Ratio scale
Aliases on dial-up account (other names for your e-mail account)	Ratio scale
Starter Kit for browser configuration	Ratio scale
24 Hour Toll-free customer service desk	Ratio scale
Intekom Newsletter	Ratio scale
Newsgroups	Ratio scale
On-line registration	Ratio scale
Intekom Home Page	Ratio scale

Table 5.12. Flow questions.

Question	Input field
I am very skilled in....	
...communicating on Internet e.g. e-mail and/or chat programs	Ratio scale
... surfing the World Wide Web e.g. clicking on links and/or using search engines to find information.	Ratio scale
... doing transactions on the Internet e.g. ordering goods or doing home banking.	Ratio scale
The following is a challenge to me...	
...communicating on Internet e.g. e-mail and/or chat programs	Ratio scale
... surfing the World Wide Web e.g. clicking on links and/or using search engines to find information.	Ratio scale
... doing transactions on the Internet e.g. ordering goods or doing home banking.	Ratio scale

Retention measurement:

Data-mining was done within the Intekom database to establish which subscribers left Intekom between the survey date October 15, 1998 and May 31, 1999.

5.3. Sampling and collection

Two probability samples of 5 000 e-mail addresses each were drawn from the Internet Service Provider database. An e-mail invitation to a web-based questionnaire was mailed out on the first of October 1998 at 10:00. One sample was promised double movie tickets for the first 100 completed questionnaires submitted and mouse-pads for the next 200 respondents. No promise of incentive was made to the other sample. For relationship reasons both samples were in the end awarded with the same incentive structure although not promised.

In this study the Internet Service Provider database information was used to validate respondents as subscribers, make sure they complete only one questionnaire and provide subscriber postal codes to weigh the sample realisation back into the population.

In a pilot sample it was found that a large percentage of the respondents used an alias (secondary e-mail address) and not their main e-mail account to respond to the questionnaire. The impact of this is that e-mail addresses and e-mail aliases must be correlated to establish identity control. Internet service providers are in a unique position to provide this type of correlation. Response control problems are very similar to those experienced with telephone and mail surveys.

The productive time associated with the completion of the questionnaire had a comfortable fit with a 10-day period.

More than half of the Internet research responses were collected within the first 48 hours after launch of the questionnaire.

The response patterns over time were almost identical, with similar drop-off rates occurring for both samples. However, the response volume for the incentive group was nine percent higher than for the non-incentives group. From the 5000 invites, approximately 70% of the incentivised group followed the link to the web page, compared to 42% of the non-incentivised group. Of the Web page visitors, 34% and 37% respectively started with the questionnaire. Of those starting, 78% and 56% respectively proceeded to the middle of the questionnaire, and of these 88% and 84% respectively submitted a questionnaire. Please see table 5.13.

Table 5.13. Response patterns over time.

	Web-page	Start questionnaire	Middle of questionnaire	Submit questionnaire
Incentivised group	70%	34%	78%	88%
Non-incentivised group	42%	37%	56%	84%

In addition, 66% of responses were generated within the first 48 hours after launch of the questionnaire for both samples. Detailed records were kept as to what time was spent on the questionnaire, and when questionnaires were completed. Most questionnaires were submitted after office hours. It is interesting to note that the incentivised sample took less time to complete the questionnaire than the non-incentivised sample. A total of 1372 questionnaires were completed.

5.4. Multivariate Analysis

Multivariate analysis can be seen as the analysis of multiple variables in a single relationship or multiple sets of relationships (Hair *et al.*, 1995:2). Any simultaneous analysis of more than two variables can be loosely considered multivariate analysis.

The use of multiple variables and the reliance on their combination (the variate) in multivariate techniques also focuses attention on a complimentary issue called measurement error. Measurement error is the degree to which the observed values are not representative of the 'true' values.

The researcher's goal of reducing measurement error can follow several paths. In assessing the degree of measurement error present in any measure, the analyst must address both the validity and reliability of the measure.

Validity is the degree to which a measure accurately represents what it is supposed to. Ensuring validity starts with a thorough understanding of what is to be measured and then making the measurement as accurate as possible. Accuracy does not ensure validity.

Reliability is the degree to which the observed variable measures the 'true' value and is 'error free'; it is the opposite of measurement error. If the same measure is asked repeatedly, for example, more reliable measures will show greater consistency than less reliable measures. The researcher should always assess the variables being used and if valid alternative measures are available, choose the variable with the higher reliability.

The researcher may also choose to develop multivariate measurements, also known as summated scales, where several variables are joined to represent a composite variable. The objective is to avoid using only a single variable to represent a concept, and instead use several variables as indicators, all representing differing facets of the concept to obtain a more 'well-rounded' perspective. The use of multiple indicators allows the researcher to more precisely specify the responses desired and does not place total reliance on a single response but instead on the 'average' or 'typical' response to a set of related responses. The guiding premise is that multiple responses more accurately reflect the 'true' response than does a single response.

The impact of measurement error and poor reliability cannot be directly seen, because they are embedded in the observed variables. The researcher must therefore always work to increase reliability and validity, which in turn will result in a 'truer' portrayal of the variables of interest. Poor results are not always due to measurement error, but the presence of measurement error is guaranteed to distort the observed relationships and make multivariate techniques less powerful.

All the multivariate techniques, except for cluster analysis and multidimensional scaling, are based on the statistical inference of a populations values or relationships among variables from a randomly drawn sample of that population. If a census was conducted of the entire population, then statistical inference is unnecessary, because any difference of relationship, however small, is 'true' and does exist. But rarely, if ever, is a census conducted; therefore, the researcher is forced to draw inferences from a sample.

Interpreting statistical inferences requires that the researcher specify the acceptable levels of statistical error. The most common approach is to specify the level of Type I error, also known as alpha. The Type I error is the probability of rejecting the null hypothesis when actually true, or in simple terms, the chance of the test showing statistical significance when it actually is not present, the case of a 'false positive.' By specifying an alpha level, the researcher sets the allowable limits for error by specifying the probability of concluding that significance exists when it really does not.

But in specifying the level of Type I error, the researcher also determines an associated error, termed the Type II error or Beta. Type II errors are the probability of failing to reject the null hypothesis when it is actually false. An even more interesting probability is 1 - Beta, termed the power of the statistical inference test. Power is the probability of correctly rejecting the null hypothesis when it should be rejected. Thus, power is the probability that statistical significance will be indicated if it is present (Table 5.14).

Table 5.14. The relationship of the different error probabilities in the hypothetical setting of testing for the difference in two means.

		Reality	
		Ho: No Difference	Ha: Difference
Statistical Decision	Ho: No Difference	1- alpha	Beta Type II error
	Ha: Difference	Alpha Type I error	1 - Beta Power

Type I and Type II errors are negatively related, and as type I errors becomes more restrictive (moves closer to zero), the type II error increases.

Reducing the type I errors also reduces the power of the statistical test. Thus, the analyst must strike a balance between the level of alpha and the resulting power.

Power is not solely a function of alpha. It is actually determined by three factors:

(1) Effect size: The probability of achieving statistical significance is based not only on statistical considerations but also on the actual magnitude of the effect of interest (for example the correlation between variables) in the population, termed the effect size. To assess the power of any statistical test, the researcher must first understand the effect being examined. Effect sizes are defined in standardised terms for ease of comparison. Mean differences are stated in terms of standard deviations, so that an effect size of .5 indicates that the mean difference is one-half of a standard deviation. For correlations, the effect size is based on the actual correlation between the variables.

(2) Alpha: as alpha becomes more restrictive, power decreases. This means that as the analyst reduces the chance of finding an incorrect significant effect, the probability of correctly finding an effect also decreases. Conventional guidelines suggest alpha levels of .05 and .01. But the analyst must consider the impact of this decision on the power before selecting the alpha level.

(3) Sample size: At any given alpha level, increased sample size always produce greater power to the statistical test. But increased sample sizes can also produce 'too much' power. By increasing sample sizes, smaller and smaller effects will be found to be statistically significant, until at very large sample sizes almost any effect is significant. The researcher must always be aware that sample size can impact the statistical test by either making it insensitive (at small sample sizes) or overly sensitive (at very large sample sizes).

Acceptable levels of power should be achieved if studies are designed to achieve alpha levels of at least .05 with power levels of 80% (Hair *et al.*, 1995:11).

5.4.1.1. Multiple Regression

Multiple regression is the appropriate method of analysis when the research problem involves a single metric dependent variable presumed to be related to one or more metric independent variables. The objective of multiple regression analysis is to predict the changes in the dependant variable in response to changes in the several independent variables. This objective is most often achieved through the statistical rule of least squares.

Whenever the researcher is interested in predicting the amount or magnitude of the dependant variable, multiple regression is useful. For example, monthly expenditures on dining out (dependant variable) might be predicted from information regarding a family's income, it's size, and the age of the head of household (independent variables). Similarly, the researcher might attempt to predict a company's sales from information on its expenditures for advertising, the number of salespeople, and the number of stores carrying its products.

5.4.1.2. Factor Analysis

Factor analysis, including variations such as component analysis and common factor analysis, is a statistical approach that can be used to analyse interrelationships among a large number of variables and to explain these variables in terms of their common underlying dimensions (factors). The objective is to find a way of condensing the information contained in a number of original variables into a smaller set of variables.

5.4.1.3. Structural Equation Modelling

Structural equation modelling is a technique that allows separate relationships for each of a set of dependant variables. In its simplest sense, structural equation modelling provides the appropriate and most efficient estimation technique for a series of separate multiple regression equations estimated simultaneously. It is characterised by two basic components; the structural model and the measurement model.

The structural model is the 'path' model, which relates independent to dependant variables. In such situations, theory, prior experience, or other guidelines allow the researcher to distinguish which independent variables predict each dependant variable.

The measurement model allows the researcher to use several variables (indicators) for a single independent or dependant variable. For example, the dependant variable might be a concept represented by a summated scale, such as self-esteem. In the measurement model the researcher can assess the contribution of each scale item as well as incorporate how well the scale measures the concept (reliability) into the estimation of the relationships between dependant and independent variables. The procedure is similar to performing a factor analysis of the scale item and using the factor scores in the regression.
The Perception value of the SERVQUAL scale will be used during Structural equation modelling because:

Performance based or perceptions-only measures of service quality have shown the following two elements:

(1) Higher correlation's with other measures of the same construct (convergent validity).
(2) Higher correlation's with other conceptually related constructs (Pitt *et al.*, 1997).

5.4.2. Selection of multivariate techniques for this study

The analyst needs to make three judgements concerning the research objective and nature of the data:

(1) Can the variables be divided into independent and dependent classifications based on some theory?

The answer to this question indicates whether a dependence or interdependence technique should be utilised. A dependence technique may be defined as one in which a variable or set of variables is identified as the dependent variable to be predicted or explained by other variables known as independent variables. An example of a dependence technique is multiple regression analysis. In contrast, an interdependence technique is one in which no single variable or group of variables is defined as being independent or dependent. Rather, the procedure involves the analysis of all variables in the set simultaneously. Factor analysis is an example of an interdependence technique.

(2) If they can, how many variables are treated as dependent in a single analysis?

Dependence techniques can be classified as those having a single dependent variable, several dependant variables, or even several dependent/independent relationships.

(3) How are the variables measured?

Dependence techniques can be further classified as those with either metric (quantitative/numerical) or non-metric (qualitative/categorical) dependent variables. If the analysis involves a single dependent variable that is metric, the appropriate technique is either multiple regression analysis or conjoint analysis. On the other hand, if the single dependent variable is non-metric (categorical), then the appropriate techniques are multiple discriminant analysis and linear probability models.

When the research problem involves several dependent variables, four other techniques of analysis are appropriate. If the several dependent variables are metric, we must then look to the independent variables. If the independent

variables are non-metric, the technique of multivariate analysis of variance should be selected. If the independent variables are metric, canonical correlation is appropriate. If the several dependent variables are non-metric, then they can be transformed through dummy variable coding (0-1) and canonical analysis can again be used. Finally, if a set of dependent/independent variable relationships is postulated, then structural equation modelling is appropriate.

With interdependence techniques, the variables cannot be classified as either dependent or independent. Instead, all the variables are analysed simultaneously in an effort to find an underlying structure to the entire set of variables or subjects. If the structure of variables is to be analysed, then factor analysis is the appropriate technique. If cases of respondents are to be grouped to represent structure, then cluster analysis is selected. Finally, if the interest is in the structure of objects, the techniques of multidimensional scaling should be applied.

Selection of the appropriate multivariate technique to be utilised depends on the answers of these three questions (Hair *et al.*, 1984:25).

5.4.3. Methods and Scope of the Investigation

Qualitative objectives:

(1) To develop a visual representation of an Internet service providers service design by utilising service blueprinting.

Service blueprinting will be used to describe the service delivery process of the Internet Service provider. As mentioned earlier in-depth interviews with key manager provides the information for drawing the blueprints.

(2) To determine the fail-points in service delivery from the subscribers point of view.

The qualitative question referring to service delivery failures and recovery failures mentioned above is used and the responses mapped back to the the subscriber lifecycle.

(3) To prioritise fail-point to be addressed within the ISP.

Fail-points are prioritised using the frequency of occurrence of the fail-points and recovery failures within the sample.

Empirical objectives:

(1) Testing the reliability and validity of the SERVQUAL instrument for the measurement of service quality in the Internet industry.

The reliability of the SERVQUAL scale is appraised with reliability/item analysis.

The following hypotheses are tested:

H1: The compound SERVQUAL scale is a reliable measure of service quality within the Internet industry.
H2: The core service dimension of the SERVQUAL scale is reliable.
H3: The tangible dimension of the SERVQUAL scale is reliable.
H4: The reliability dimension of the SERVQUAL scale is reliable.
H5: The responsiveness dimension of the SERVQUAL scale is reliable.
H6: The assurance dimension of the SERVQUAL scale is reliable.
H7: The empathy dimension of the SERVQUAL scale is reliable.
H8: Reliability is the most important contributor to service quality within the Internet industry (Nitecki, 1997).

The validity of the SERVQUAL scale is assessed with confirmatory factor analysis.

The following hypotheses are tested:

H9: The compound SERVQUAL scale is valid for the Internet industry.
H10: The reliability factor is valid.
H12: The responsiveness factor is valid.
H13: The assurance factor is valid.
H14: The empathy factor is valid.

(2) Empirically confirming interrelationships between service quality, customer satisfaction and relationship quality.

Structural equation modelling is applied in order to establish the following causal hypotheses:

H15: Service quality leads to customer satisfaction.
H16: Customer satisfaction leads to relationship quality
H17: Service quality leads to relationship quality

(3) Testing hypotheses around different flow clusters with respect to customer satisfaction.

ANOVA analysis is used to establish if significant differentiation occurs within customer satisfaction between the different flow clusters. The following hypotheses will be tested:

H18: There is a significant difference between the different communication flow clusters with respect to customer satisfaction in the Internet industry.

H19: There is a significant difference between the different surfing flow clusters with respect to customer satisfaction in the Internet industry.
H20: There is a significant difference between the different transaction flow clusters with respect to customer satisfaction in the Internet industry.

(4) Testing hypothesis around a proposed relationship between value added services and respectively service quality, customer satisfaction and relationship quality.

The relationships between value added services and the other constructs within the model are to be tested for significance by using multiple regression analysis. The following hypotheses will be tested:

H21: Value added services satisfaction (independent variable) has a positive relationship towards service quality (dependent variable) within the Internet industry.
H22: Value added services satisfaction (independent variable) has a positive relationship towards customer satisfaction (dependent variable) within the Internet industry.
H23: Value added services satisfaction (independent variable) has a positive relationship towards relationship quality (dependent variable) within the Internet industry.

(5) Testing hypothesis around a proposed relationship between Internet satisfaction and respectively service quality, customer satisfaction and relationship quality.

The relationships between Internet satisfaction and the other constructs within the model are to be tested for significance by using multiple regression analysis. The following hypotheses will be tested:

H24: Internet satisfaction (independent variable) has a positive relationship towards service quality (dependent variable) within the Internet industry.
H25: Internet satisfaction (independent variable) has a positive relationship towards customer satisfaction (dependent variable) within the Internet industry.
H26: Internet satisfaction (independent variable) has a positive relationship towards relationship quality (dependent variable) within the Internet industry.

(6) Testing the relationship between relationship quality and customer retention.

The relationships between relationship quality and customer retention will be tested for significance by using multiple regression analysis. The following hypothesis will be tested:

H27: Relationship quality has a positive relationship to customer retention.

5.4.4 Terminology

Some of the critical terms used in the finding chapter will now be reviewed to assist the reader with the interpretation and understanding of Chapter 6:

- ✓ The **coefficient of determination (R-square)** represents the measure of the proportion of the variance of the dependent variable about its mean that is explained by the independent, or predictor, variables. The coefficient can vary between zero and one. If the regression model is properly applied and estimated, the analyst can assume that the higher the value of the R-square, the greater the explanatory power of the regression equation, and therefore the better the prediction of the criterion variable.

- ✓ **Correlation coefficient (r)** indicates the strength of the association between the dependent and independent variables. The sign (+ or -) indicates the direction of the relationship. The value can range from −1 to +1, with +1 indicating a perfect positive relationship, zero indicating no relationship, and −1 indicating a perfect negative or reverse relationship (as one grows larger, the other grows smaller).

- ✓ **Degrees of freedom (df)** are calculated from the total number of observations minus the number of estimated parameters. Degrees of freedom provide a measure of how restricted the data are to reach a level of prediction. If the degrees of freedom are small, this suggests that the resulting prediction may be less generalisable, because all but a few observations were incorporated in the prediction. Conversely, a large degree of freedom value indicates that the prediction is fairly 'robust' with regard to being representative of the overall sample of respondents.

- ✓ **Power** can be seen as the probability that a significant relationship will be found if it actually exists. This complements the more widely used significance level alpha.

- ✓ **Specification error** represents the error in predicting the dependent variable caused by excluding one or more relevant independent variables that can bias the estimated coefficients of the included variables, as well as decrease the overall predictive power of the regression model.

- ✓ The term **standardisation** is used when, using standardised data, the regression coefficients are known as beta coefficients, which allow the researcher to compare the relative effect of each independent variable on the dependent variable.

5.5. Summary of Chapter 5

Chapter 5 reviews the measurement questions, sampling, collection as well as the scope and methods of analysis. In the following chapter the focus will move to the key finding and recommendations when the proposed model is empirically tested and qualitative insight is obtained in the service delivery process of the Internet service provider.