

CHAPTER 4

RESEARCH RESULTS

This chapter is limited to the findings of the research. The appropriate analytical technique will be used in analyzing the data. Where ever possible consistent patterns and summarizing the appropriate details, revealed in the investigation will be presented. Statistical analysis, SPSS ver7.5 will be used to analyze all the data from a sample of 100 respondents.

4.1 Characteristics of respondents

A frequency analysis was performed on all of the variables. The purpose is to identify and select the data which are relevant and further determine whether there are any errors committed during the conversion process. In this case no errors were detected after the frequency run.

4.1.1 Demographic Profile

In terms of gender, 83 % or 83 respondents were male respondents and the remaining 17% or 17 respondents were female.

Age wise the samples generally reflect the younger generation with a majority of 62% below the age of 35. The remaining 38% were all between the ages of 36 to 55 years old.

Majority of the respondents were from the Chinese ethnic group with 48% followed by Indians with 33%, Malays with 16% and the other races with 3%.

In terms of gross monthly income 47 % of the respondents were earning salaries less than RM3,000 with 31% earning salaries ranging from RM3,000 – RM5,000 with the remaining 22% earning more than RM5000. The majority of the respondents were earning salaries ranging from RM3,000 – RM 5,000.

On the extreme end of the scales about 18% of the respondents were earning RM1,000-RM2,000 and 8% were earning RM10,000 and above.

4.1.2 Literacy Profile

The data revealed that 53% of the respondents had a minimum degree whereas the remaining 47% either had a diploma, certificate or no qualifications at all. On extreme ends, 12% had masters degree and 2% did not have any qualifications.

Chi-square analysis was done by cross-tabulating race, income and educational qualification against the Service Provider The Pearson Chi-square values were

0.092, 0.112 and 0.000. This would mean that only educational qualification was significant enough to draw some hypothesis or make some predictive trend. In this we can conclude that most of the degree holders prefer to subscribe to Maxis.

4.1.3 Crosstabulation of Race, Income, Education, sex, age and marital status against the type of service providers.

To analyze whether there are any relationship of race, income, education, sex, age and marital status, against the type of service providers a Pearson Chi Square analysis was done. Table 3 illustrates the values. Most Pearson values exceeding the 0.05 significance level will accept the null whereas values less than 0.05 will accept the alternate hypothesis (eg. Race vs service providers).

The hypothesis can be summarized as follows:-

$p > 0.05 = H_0$: **Accept null hypothesis**- That there is no relationship between the two set of variables under analysis.

$p < 0.05 = H_1$: **Accept alternate hypothesis** – That there is a relationship between the two set of variables under analysis.

From table 3 we can see that only that only education and sex have values < 0.05 . This means that the alternate hypothesis that is accepted. i.e. there is a relationship between educational level and sex (gender) with the type of cellular service provider. Although there exist a strong relationship between the two

variables, due to insufficient information, conclusion cannot be made on why this is so. It may be a coincidence or a combination inappropriate sampling problems.

4.2 Reliability of the scale

A reliability test was performed on the GAP Scale, SERVQUAL Scale and the customer's option scale. The results are tabulated in Table 2 below:

Table 2: Initial Internal Reliability Coefficients

Questions	Scale	Reliability Coefficient	Number of Items
Q9 – Q35	Gap Model	0.8865	27
Q43a -Q43j	Customer's Opinion	0.9771	10
Q46 – Q65	Serqual Model	0.9492	22

4.3 Factorial Analysis

The primary purpose of the factorial analysis is for data reduction and summarization. This chapter will determine the dimensions extracted form two models, namely the Gap and Serqual Model.

4.3.1 Dimensions of Gap Model

The statistical technique of factor analysis utilizing the SPSSx software programme is used to identify the dimensions by means of principal component factor model and orthogonal factors solution. The factors are then rotated using VARIMAX rotation.

Factor analysis is used to examine the correlation between the variables which are latent if it is in a large set of variables. The correlation matrix of the 27 items of all the respondents are obtained. From table 4, we can see that there were 7 factors or dimensions identified. The 7 factors accounted for 71.52% of the total variance of the 27 items. The 7 factors extracted are based on latent root criterion, having eigenvalues >1 . The rationale for this criterion is that at least one individual factor should account for at least one variable if it is to be retained for interpretation.

Having done this, a Varimax rotation was done on the 27 items to determine the correlation between the 7 dimensions and the 27 items. The results of the varimax rotation is given in table 5. The rotation converged after 8 iterations after using the Kaiser Normalization method. Those variables having a factor loading greater than or equal to 0.5 are identified. It can be clearly seen that there are 7 dimensions compared to 5 identified by Parasuram. This clearly indicates that the Malaysian respondents believe that some of the questionnaire should have a different dimension. As there is only one variable in the 6th. & 7th. component, they were ignored. However it must be noted that this 6th.&7th. component

contributed to 8.101 % variation. With this 5 remaining dimensions a reliability analysis was be done to determine the Cronbach Coefficient for internal reliability and this is presented in the next section.

Table 3 – Crosstabulation of demographic Profile versus Cellular Service Providers

Variables	Maxis	Adam	TMTouch	Mobikom	Celcom	Digi1800	Others	Total	Pearson Chi-square
Race									0.092
Chinese	15	6	6	2	12	5	2	48	
Malay	4		1	1	3	6	1	16	
Indian	18	5	1	4	2	3	-	33	
Others	2	1	-	-	-	-	-	3	
Sub-Totals	39	12	8	7	17	14	3	100	
Income									0.112
Rm1k-2k	3	4	2	-	5	2	2	18	
Rm2k-3K	17	2	3	1	1	4	1	29	
Rm3k-5K	8	6	3	4	5	5	-	31	
Rm5k-7k	6	-	-	1	2	2	-	11	
Rm7k-10k	2	-	-	1	-	-	-	3	
>Rm10K	3	-	-	-	4	1	-	8	
	39	12	8	7	17	14	3	100	
Educ.									0.000
Masters	4	-	2	-	3	3	-	12	
Prof. Qual.	3	-	-	-	-	5	-	8	
Bachelor	17	4	3	3	4	2	-	33	
Adv.Dip.	4	2	-	-	-	1	-	7	
Diploma	6	3	2	2	3	1	-	17	
Cert.	2	1	1	1	-	-	-	5	
HSC	3	1	-	1	4	-	-	9	
SPM	-	1	-	-	3	2	1	7	
Others	-	-	-	-	-	-	2	2	
Sub-total	39	12	8	7	17	14	3	100	
Sex									0.033
Male	31	11	5	5	17	13	1	83	
Female	8	1	3	2	-	1	2	17	
Sub-total	39	12	8	7	17	14	3	100	
Age									0.702
25-30	10	6	5	1	8	6	2	38	
31-35	7	4	-	3	5	4	1	24	
36-40	9	-	1	1	-	3	-	14	
41-45	8	2	1	2	2	1	-	16	
46-50	3	-	1	-	1	-	-	5	
51-55	2	-	-	-	1	-	-	3	
Sub-total	39	12	8	7	17	14	3	100	
Marital Status									0.853
Single	12	4	5	1	3	3	1	29	
Married	24	8	3	6	14	11	2	68	
Divorced/ Separated	3	-	-	-	-	-	-	3	
Sub-total	39	12	8	7	17	14	3	100	

Table 4: Factor Identification with eigenvalue greater than one - Gap Model

Question Number	Variable Name	Communality	Factor	Eigenvalue	Pct. of Variance	Cum Pct.
Q9	PGAP1	0.666	1	8.887	32.914	32.914
Q10	PGAP2	0.718	2	3.435	12.721	45.635
Q11	PGAP3	0.848	3	2.056	7.613	53.248
Q12	PGAP4	0.845	4	1.501	5.560	58.808
Q13	PGAP5	0.847	5	1.243	4.604	63.412
Q14	PGAP6	0.688	6	1.167	4.321	67.733
Q15	PGAP7	0.724	7	1.023	3.787	71.520
Q16	UGAP1	0.700				
Q17	UGAP2	0.644				
Q18	UGAP3	0.788				
Q19	UGAP4	0.652				
Q20	UGAP5	0.536				
Q21	UGAP6	0.825				
Q22	PROC1	0.751				
Q23	PROC2	0.662				
Q24	PROC3	0.555				
Q25	PROC4	0.783				
Q26	PROC5	0.660				
Q27	BEGAP1	0.689				
Q28	BEGAP2	0.736				
Q29	BEGAP3	0.667				
Q30	BEGAP4	0.713				
Q31	PERGAP1	0.716				
Q32	PERGAP2	0.716				
Q33	PERGAP3	0.655				
Q34	PERGAP4	0.779				
Q35	PERGAP5	0.747				

4.3.2 Dimensions for SERVQUAL Model

Following along the same principals as in 4.3.1, factor analysis was done for the SERVQUAL Model. Table 6, below illustrates the result of the factorial analysis. The SERVQUAL Model has identified 3 dimensions instead of 5 as identified by Parasuraman et al (1988). These 3 factors exist with eigenvalue greater than 1. Factor 1 ,2 and 3 accounts for 41.383%,22.018% and 11.717 % respectively. The cumulative percentage of all 3 factors is 75.118%. This means that 75.118% of the variance is accounted by 3 factors.

Table 5: Rotated component matrix for the Gap Model using varimax with Kaiser Normalization.

Question Number	Variable Name	1	2	3	4	5	6	7
Q9	PGAP1		0.611					
Q10	PGAP2	0.747						
Q11	PGAP3	0.886						
Q12	PGAP4	0.860						
Q13	PGAP5	0.825						
Q14	PGAP6			0.707				
Q15	PGAP7			0.770				
Q16	UGAP1			0.673				
Q17	UGAP2			0.712				
Q18	UGAP3							0.869
Q19	UGAP4				0.510			
Q20	UGAP5			0.503				
Q21	UGAP6						0.766	
Q22	PROC1				0.745			
Q23	PROC2				0.693			
Q24	PROC3				0.501			
Q25	PROC4				0.621			
Q26	PROC5		0.681					
Q27	BEGAP1			0.557				
Q28	BEGAP2			0.684				
Q29	BEGAP3			0.627				
Q30	BEGAP4			0.792				
Q31	PERGAP1					0.820		
Q32	PERGAP2					0.789		
Q33	PERGAP3		0.571					
Q34	PERGAP4	0.540						
Q35	PERGAP5	0.501						

4.4 Reliability Analysis

Reliability is the degree to which measures are free from errors , yielding consistent results. Imperfections may happen in the measuring process that affect the scores. This results from misunderstanding a question, respondents inability to reason and other transistionary factors such as mood, whim or surrounding questions.

**Table 6: Factor Identification with eigenvalue greater than one
– SERVQUAL Model**

Question Number	Variable Name	Communality	Factor	Eigenvalue	Pct. of Variance	Cum Pct.
Q1	ASSUR1	0.852	1	12.389	56.314	56.314
Q2	ASSUR2	0.789	2	2.792	12.690	69.004
Q3	ASSUR3	0.654	3	1.345	6.114	75.118
Q4	ASSUR4	0.704				
Q5	EMPATHY1	0.870				
Q6	EMPATHY2	0.775				
Q7	EMPATHY3	0.771				
Q8	EMPATHY4	0.843				
Q9	EMPATHY5	0.802				
Q10	REL1	0.758				
Q11	REL2	0.774				
Q12	REL3	0.630				
Q13	REL4	0.811				
Q14	REL5	0.797				
Q15	RESP1	0.823				
Q16	RESP2	0.889				
Q17	RESP3	0.783				
Q18	RESP4	0.828				
Q19	TANG1	0.523				
Q20	TANG2	0.625				
Q21	TANG3	0.559				
Q22	TANG4	0.665				

Table 7: Rotated component matrix for the SERVQUAL Model using varimax with Kaiser Normalization.

Question Number	Variable Name	1	2	3
Q59	ASSUR1	0.868		
Q60	ASSUR2	0.825		
Q61	ASSUR3		0.627	
Q62	ASSUR4		0.672	
Q63	EMPATHY1	0.826		
Q64	EMPATHY2	0.843		
Q65	EMPATHY3	0.840		
Q66	EMPATHY4	0.876		
Q67	EMPATHY5	0.823		
Q50	REL1		0.732	
Q51	REL2		0.795	
Q52	REL3		0.670	
Q53	REL4		0.779	
Q54	REL5		0.871	
Q55	RESP1	0.857		
Q56	RESP2	0.901		
Q57	RESP3	0.869		
Q58	RESP4	0.877		
Q46	TANG1			0.706
Q47	TANG2			0.724
Q48	TANG3			0.718
Q49	TANG4			0.754

4.4.1 Reliability analysis on the Gap Model

By taking Nunnally's(1967) threshold of acceptable reliability coefficient as equal to or greater than 0.5, reliability was conducted for the remaining 5 factors. This was as a result of dropping factor 6 and 7. The results are presented below :-

Table 8: Internal Consistencies of the 5 Gap Model Dimensions

DIMENSION	LABEL	NUMBER OF ITEMS	RELIABILITY COEFFICIENTS (ALPHAS)	ITEMS
Perception Gap	F1	6	0.9086	Q10,Q11,Q12,Q13, Q34,Q35
Understanding Gap	F2	6	0.8309	Q26,Q27,Q28,Q29, Q30,Q33.
Procedural Gap	F3	6	0.7984	Q9,Q14,Q15,Q16, Q17, Q20.
Behavioral Gap	F4	5	0.8003	Q19, Q22, Q23, Q24, Q25
Perception Gap	F5	2	0.6485	Q31,Q32
Reliability of Linear Combination (Total- scale Reliability)			= 0.9492	

The initial reliability determined by taking the total scale with all the 27 items before factorial analysis was done, was 0.8865 (see table 2). After the varimax rotation the total scale with 25 items was 0.8996, indicating a significant improvement. This means that by dropping the 6th. and 7th. factors, the reliability improved from 0.8865 to 0.8996.

4.4.2 Reliability Analysis on the SERVQUAL Model

Following along the lines of 4.4.1, reliability was done on the SERVQUAL Model.

Table 9: Internal Consistencies of the dimensions of the SERVQUAL Model.

DIMENSION	LABEL	NUMBER OF ITEMS	RELIABILITY COEFFICIENTS (ALPHAS)	ITEMS
Responsiveness	F1	11	0.9765	Q55,Q56,Q57,Q 58,Q59, Q60,Q63,Q64,Q 65,Q66, Q67.
Reliability	F2	7	0.9178	Q50,Q51,Q52,Q 53,Q54, Q61,Q62.
Tangibles	F3	4	0.7122	Q46,Q47,Q48,Q 49.
Reliability of Linear Combination (Total- scale Reliability)			= 0.8996	

The first, dimension "responsiveness" was maintained as this accounted for most of the loadings in factor 1. This is also similar for the second dimension "reliability". The existence of only 3 factors confirms that SERVQUAL's % dimensions are not consistent and cannot be applied universally to all service industries(Dabholkar 1996). Taylor(1992)'s research findings has shown that

SERVQUAL scale was a one dimension. The total Cronbach coefficient was 0.8996, indicating that scale could be treated as one dimension.

4.4.3 Reliability of Opinion Scale (Section F).

The reliability of the scale used for the respondents' opinion on about the service provider was tested and presented earlier in table 2. The total reliability coefficient alpha, was determined to be 0.9771 which is highly favorable in determining the satisfaction index.

4.5 Satisfaction Index

Using the questions in section F of the questionnaire the Satisfaction Index was determined by taking the mean scores for each question and the total mean.

Table 10 : Measurements of Satisfaction Index

			Maxis	Adam	Tm Touch	Mobikom	Celcom	Digi 1800	Others	Avg.
	Label	Q. No.	Customer Satisfaction Index for each Service Provider							
Opnion1	Efficient	43a	6.82	6.42	5.13	6.71	6.53	7.07	6.53	6.53
Opnion2	Courteous	43b	7.03	6.92	6.38	6.43	6.53	7.00	4.33	6.75
Opnion3	Helpful	43c	7.00	6.75	5.50	6.29	6.47	6.29	4.33	6.53
Opnion4	Professional	43d	6.87	6.58	6.13	6.14	6.35	6.50	4.33	6.51
Opnion5	Friendly	43e	6.87	6.75	5.50	6.29	6.41	6.29	4.33	6.47
Opnion6	Respectful	43f	6.74	7.17	5.13	6.57	6.12	6.57	4.33	6.45
Opnion7	Reassuring	43g	6.56	6.67	5.37	6.43	6.29	6.42	4.67	6.35
Opnion8	Concerned	43h	6.71	6.25	4.75	5.71	6.05	6.00	4.67	6.16
Opnion9	Keen to help	43I	6.67	6.33	5.00	5.00	5.94	5.50	4.67	6.03
Opnion10	Knowledgeable	43j	6.72	6.92	5.25	5.85	5.94	5.92	4.67	6.26
C.S.I. (average score)			6.80	6.67	5.42	6.14	6.26	6.36	4.43	

From Table 10 above, it is quite evident that Maxis stands out the highest, followed by Adam, Digi1800 (Mutiara Telekom), Celcom, Mobikom and others. One big surprise is the ranking of Celcom in the 4th. place. This is in line with the results of a survey released by the Telecommunications Department (Ministry of Energy, Post and Telecommunications – *Business news-NST* Feb. 3, 1998). The report concluded that customers were generally satisfied with all the operators but faith in Celcom Digital's fraud protection fell below 80% because of numerous "cloning" complaints. Over 80% of the Service Providers averaged just above 65% or a CSI of 6.5. This result is very close to CSI values given in Table 10.

4.6 Analysis of Means of the Gap Model

Analysis was done to determine the mean of means for each of the 5 gaps in Section C of the questionnaire. The questionnaires developed for measuring the 5 Gap are firstly used to measure the respondents' expectation of service quality and then his/her perception of the Service Provider's service quality. The questions in each dimension are so designed that the difference between the respondents' expectation and perception is the measure of the gap. From Table 11 below, it is quite evident that there are large gaps in each of the 5 dimensions. From the score we can see that Maxis and Adam have the lowest gap with an average score not exceeding 4.3 or 43 % wide. This means that there are significant gaps that the Service Provider should look into if he wants to improve his service quality and Satisfaction Index. One significantly high score is Celcom with 5.13 or 51.3 % gap. Their low CSI scores confirm this.

Table 11: Average scores for each of the five dimensions of the Gap Model

Service Provider	Measurement of the Mean of the means for each of the five gaps					
	Promotional	Understanding	Procedural	Behavioral	Perception	Average
MAXIS	4.11	4.12	4.42	4.50	4.25	4.28
ADAM	4.44	4.50	3.90	3.90	4.70	4.29
TMTOUCH	4.96	5.20	5.10	4.84	4.93	5.01
MOBIKOM	4.47	4.95	4.40	3.79	4.74	4.47
CELCOM	4.66	5.17	5.36	5.38	5.07	5.13
DIGI1800	4.14	4.19	5.67	5.71	4.96	4.93
OTHERS	5.38	5.78	5.00	4.42	5.07	5.13
TOTAL	4.37	4.55	4.76	4.73	4.65	

Table 12: Oneway ANOVA for Service Gaps versus Gender

Label	Gender	Number	Mean	Std.Dev.
Promotional Mean	Male	83	6.93	1.5288
	Female	17	5.92	0.9037
	Total	100	6.76	1.4877
Understanding Mean	Male	83	5.99	1.2579
	Female	17	5.07	0.6350
	Total	100	5.84	1.2223
Procedural Mean	Male	83	6.75	1.6722
	Female	17	6.61	1.4448
	Total	100	6.72	1.6297
Behavioural Mean	Male	83	6.81	1.5760
	Female	17	6.29	1.3842
	Total	100	6.72	1.5506
Perception Mean	Male	83	5.84	1.0605
	Female	17	4.98	0.8470
	Total	100	5.69	1.0729

Table 12 gives the scores of the 5 gaps as perceived by different gender.

This clearly indicates that female respondents are far less sensitive as compared to male respondents.

4.7 Analysis of Reception / Transmission

Section G of the questionnaire is tried to establish the quality of reception with relative to environment.

Table13: Quality of Reception

Service Provider	Measurement of the Quality of Reception								Mean Score
	Q68	Q69	Q70	Q71	Q72	Q73	Q74	Q75	
MAXIS	5.18	6.80	4.08	3.87	6.26	4.87	5.07	4.92	5.13
ADAM	3.75	6.67	4.58	3.75	7.58	4.50	4.25	3.58	4.83
TMTOUCH	3.88	5.50	4.50	4.25	6.00	4.75	4.13	3.88	4.61
MOBIKOM	6.14	6.71	4.43	4.14	7.00	4.57	4.57	4.00	5.20
CELCOM	5.18	6.71	3.94	3.35	6.35	3.94	4.65	4.05	4.77
DIGI1800	2.93	6.21	4.29	2.71	6.50	4.79	4.00	2.50	4.24
OTHERS	4.33	4.67	4.67	5.00	5.33	5.33	5.33	5.33	5.00
TOTAL	4.63	6.51	4.22	3.69	6.47	4.64	4.65	4.14	

From Table 13, Mobikom rates the highest on almost all the scores. Subscribers of Mobikom believe, they are able to receive and dial out along the highways, outside buildings and enclosed areas. This is followed very closely by Maxis, Celcom, Adam, TMTouch and Digi1800. Others are ignored because the number of respondents in this category was only 3. However Maxis still remains popular with 39 users.