CHAPTER 4

RESEARCH FINDINGS

This chapter organized the findings of the survey and presents the research results. Firstly, this chapter describes the demographic characteristics of the respondents followed by analysis and discussions of the research are presented from factor analysis, reliability analysis, correlation and regression analysis results.

A total of 151 responses were obtained. Out of the total responses received, 9 were invalid or incomplete and such were rejected. Therefore, 142 responded questionnaires were used for the final analysis.

4.1 Summary Statistics of Survey Respondents

The demographic profile of the respondents is presented in Table 4.1. The number of male respondents was less than the female respondents. There were 40.8% males as compared to 59.2% females in this sample. The female respondents outnumbered male by 18.4%.

The majority of the respondents which represented 30.3 percent were between 41 to 50 years old. This was followed by 27.5 percent who fell within the age

range of 21 to 30 years old. Other age group of 31 to 40 years old represented 23.9 percent of the respondents.

In terms of educational background, the majority of the respondents that is 47.2 percent were SPM/STPM holder. This was followed by those pursuing bachelor's degree (26.8 percent), Diploma (21.1 percent), Master degree (4.2 percent) and Doctorate (0.7 percent). It seems that almost 50 percent of the respondents just have secondary education.

With regards to job position, non-officer made up the majority representing 55.6 percent of the total respondent. The remainders were officer amounting of 44.4 percent of the total respondent.

Majority of the respondent were not from information technology background (92.3 percent). Only 7.7 percent of the total respondents have information technology background particularly in ICT sector.

Table 4.1 indicates that the highest numbers of respondents came from the Development and Management Service sector 31%, followed by Private/Special Education sector 14.8%, and then School Management sector with a percentage of 14.1%. While the smallest portion of respondents came from Psychology sector with 2.1%.

Table 4.1

Demographic Profile of Respondents

	Variable	Value Description	Frequency	Valid Percentage (%)
1	GENDER	Male	58	40.8
		Female	84	59.2
		Total	142	100.0
2	AGE (YEARS)	Below 20	1	0.7
		21-30	39	27.5
		31-40	34	23.9
		41-50	43	30.3
		Above 50	25	17.6
		Total	142	100.0
3	JOB EXPERIENCE (YEARS)	Below 5	30	21.1
		6-10	30	21.1
		11-15	19	13.4
		16-20	22	15.5
		Above 20	41	28.9
		Total	142	100.0
4	EMPLOYMENT DURATION	Below 5	89	62.7
		6-10	29	20.4
		11-15	16	11.3
		16-20	2	1.4
		Above 20	6	4.2
		Total	142	100.0
5	HIGHEST LEVEL OF EDUCATION	Secondary school	67	47.2
		Diploma	30	21.1
		Bachelor's degree	38	26.8
		Professional Qualification	6	4.2
		Postgraduate Degree	1	0.7
		Total	142	100.0
6	EDUCATION BACKGROUND	IT	11	7.7
		None IT	131	92.3
		Total	142	100.0
7	JOB POSITION	None Officer	79	55.6
		Officer	63	44.4
		Total	142	100.0
8	DEPARTMENT	Academic	7	4.9
		Private/Special Edu.	21	14.8
		Islamic Edu.	7	4.9
		School Mgmt	20	14.1
		Evaluation & Exam.	14	9.9
		ICT	4	2.8
		Quality	9	6.3
		Psychology	3	2.1
		Dev. & Mgmt Service	44	31
		Human Dev.	13	9.2
		Total	142	100.0

4.2 Factor Analysis

Factor analysis was conducted to identify the underlying constructs that were deemed important in determining the overall level of user satisfaction amongst Pahang State Education Department employees. Principal component analysis was used as the method of extraction. The Kaiser rule for number of factors to extract was utilized. Factor components with Eigenvalue greater than one were retained and Varimax was selected as the rotation method.

The criteria was employed to avoid a situation of cross-loading, to determine and interpret whether the factors extracted were similar to those used by Igbaria et al. (1998) and Jusoh et al. (2008) in which the cut-off loading was 0.5 or greater on one factor and 0.35 or lower in the other factors.

To determine sampling adequacy, the KMO and Bartlett's test was carried out (refer Appendix 1 - Table A1). The results indicated that the KMO value of .856 indicates that the sample is great to be performed with factor analysis, as posited by Kaiser (1970). This is further confirmed by the Bartlett's Test with a significance level of p=0.000 as shown in Appendix 1 (Table A1). After performing several rounds of factor analysis, a total of six items were deleted from the analysis. The items removed due to cross-loading and value below 0.5 were PA6, PA11, PA16, PA20, PA24, and PA26. Four components were extracted with Eigenvalue exceeding 1, which explain the total variance of 57.06. The breakdowns of its values are seen in the Table 4.2.

		Component			
		1	2	3	4
PA1	IS meets my job need				**0.787**
PA2	IS is efficient				**0.778**
PA3	IS is effective				**0.837**
PA4	Overall, I'm satisfied with the system used				**0.840**
PA5	IS easy to use	**0.556**			
PA7	IS easy to learn	**0.623**			
PA8	IS is adaptable for user	**0.588**			
PA9	IS easy to become skilful	**0.606**			
PA10	IS is in a useful format	**0.632**			
PA12	IS provide clear information	**0.530**			
PA13	IS is accurate	**0.599**			
PA14	IS provide sufficient information	**0.684**			
PA15	IS is up-to-date	**0.659**			
PA17	Able to provide reports exactly user needs			**0.803**	
PA18	Able to provide precise information			**0.754**	
PA19	Information contents meets user needs			**0.782**	
PA21	ICT staffs are always willing to help		**0.744**		
PA22	ICT staffs are consistently courtesy		**0.737**		
PA23	Knowledgeable staff		**0.623**		
PA25	Understand user needs		**0.619**		
PA27	Sincere interest in solving problems		**0.734**		
PA28	Perform services right the first time		**0.728**		
	Number of Items	**9**	**6**	**3**	**4**
	Eigenvalues	**8.953**	**3.206**	**2.168**	**1.649**
	Percent of Variance Explained (57.06)	**31.975**	**11.449**	**7.742**	**5.889**
	Cronbach's Alpha	**0.879**	**0.759**	**0.872**	**0.863**
	Decision	**Retain**	**Retain**	**Retain**	**Retain**

Table 4.2

Rotated Component Matrix (a)

Based on the value of Cronbach's Alpha calculated, all factors which are 1, 2, 3 and 4 (at 0.879, 0.759, 0.872 and 0.863 respectively) are deemed to be internally reliable and consistent, thus retained for further examination.

The four factors identified are identified as follows:

- **Factor 1: System Quality**

  This factor appeared to represent the level of system quality as exhibited by the IT applications in use. It accounts for 31.975% of the total variance and is defined by nine variables.

- **Factor 2: Service Quality**

  This factor appeared to represent the service quality provided by the IT department. It accounts for 11.449% of the total variance and is defined by six variables.

- **Factor 3: Information Quality**

  This factor appeared to represent the level of quality contained within the information provided by the IT systems in use. It accounts for 7.742% of the total variance and is defined by three variables.

- **Factor 4: User Satisfaction**

  This factor appeared to represent the user satisfaction by using the systems. It accounts for 5.889% of the total variance and is defined by four variables.

4.3 Reliability Analysis

The results showed that the coefficient alpha values for all the measured variables were all above 0.5 as summarized in Table 4.3 below. The findings indicate that all the questionnaires scales score has adequate internal consistency reliability.

Factor	Cronbach's Alpha	N of Items
1	.879	9
2	.759	6
3	.872	3
4	.863	4

Table 4.3

Summary of Reliability Analysis

4.4 Testing Hypotheses and Associations among IS Attributes

Correlation analysis was carried out to test the relationship between the identified variables. Referring back to the causal model as per formulated by Delone and McLean (2002), this section analyzes the relationship between the following variables:

1. The relationship between information quality and end- user satisfaction.
2. The relationship between system quality and end-user satisfaction.
3. The relationship between service quality and end-user satisfaction.
4. The relationship between perceived importance of IS effectiveness and the actual performance of IS (surrogate for end-user satisfaction).

These tests are performed using two methods – Pearson Correlation tests and regression analysis. Pearson correlation coefficients (r) can take on only values from -1 to +1. The in front of the values indicates whether there is positive correlation (as one variable increase, so to does the other) or a negative correlation (as one variable increases, the other decrease). The sign of the absolute value (ignoring the sign) provides an indication of the strength of the relationship. A correlation of 0 indicates no relationship between the two variables. According to Cohen (1998), the strength of the relationship is low when Pearson Correlation coefficient (r) ranges from 0.1 to 0.29 or -0.1 to -0.29; medium when (r) ranges from 0.3 to 0.49 or -0.3 to -0.49 and high when (r) ranges from 0.5 to 1 or -0.5 to -1. Regression analysis was then conducted in order to assess the predictive power of the predictors (independent variables) in

explaining the variance of dependent variable. The results of the Pearson Correlation analysis and Regression analysis are shown in the Table 4.4 and Table 4.5 respectively.

Table 4.4

Pearson Correlation Analysis

Variables	System Quality	Information Quality	Service Quality	User Satisfaction
System Quality	1.00			
Information Quality	0.516(**)	1.00		
Service Quality	0.435 (**)	0.365(**)	1.00	
User Satisfaction	0.487(**)	0.223(**)	0.222(**)	1.00

** Correlation is significant at the 0.01 level.

Table 4.5

Regression Analysis

Predictors (Independent Variables)	Standardized Coefficient Beta	Significant (*p*)
System Quality	0.500	0.000
Information Quality	-0.42	0.638
Service Quality	0.20	0.813

Dependent Variable: User Satisfaction

Adjusted $R^2 = 0.222$

The summary of the coefficient (*r*) and the significance (*p*) for all hypotheses are indicated in the following Table 4.6.

Table 4.6

Summary of statistics

Hypotheses	Coefficient (*r*)	Sig (*p*)	Result
H1: There is a significant relationship between information quality and user satisfaction.	0.223	0.638	Reject
H2: There is a significant relationship between system quality and user satisfaction.	0.487	0.000	Accept
H3: There is a significant relationship between service quality and user satisfaction.	0.222	0.813	Reject
H4: There is a significant relationship between the perceived importance of IS effectiveness and the actual performance of IS.	0.539	0.000	Accept

4.4.1 Correlation between system quality, information quality, service quality and user satisfaction

Based on the computed output in Appendix 1 (Table A2), the value of R = 0.488 indicates that the strength of the relationship between the independent and dependent variables is moderate. The R^2 value of 0.238 suggests that 23.8% of the variance in user satisfaction is explained by the three variables i.e. system quality, information quality and service quality in this sample. This deduces that 76.2% of the variance in user satisfaction is explained by other variables not included in this study. Additionally, the value of adjusted R^2 at 0.222 indicates that 22.2% of user satisfaction in the population is explained by system quality, information quality and service quality.

From the Table 4.4 above, there are statistical significant relationships among all the variables. The strongest relationship is between system quality and information quality (r = 0.516). The relationship with medium strength are between system quality and user satisfaction (r = 0.487), system quality and service quality (r = 0.435) and information quality and service quality (r = 0.365). Lastly, the relationship with the lowest strength are between information quality and user satisfaction (r = 0.223) and service quality and user satisfaction (r = 0.222). It is also can be seen from the table that all the statistically significant relationships are positively related.

Regression analysis was carried out in order to assess the predictive power of the predictors (or independent variables) i.e. system quality, information quality and service quality in explaining the variance of dependent variable i.e. user satisfaction. The result of the analysis is as shown in Table 4.5. According to the Table 4.5 above, only system quality has significance level of 0.000 which were less the selected significance level of 0.05. This indicated that there is significant relationship between system quality and user satisfaction. The Adjusted R^2 inferred that 22.2% of the variance in the dependent variable could be explained by the predictors while the remaining 77.8% was explained by other factors.

The standardized coefficients value for system quality (β = 0.500) is the highest among the predictors, which indicates that system quality is the most important variable in the predicting user satisfaction. Surprisingly, information quality and service quality are not statistically significant in explaining the variance in user satisfaction despite the correlation analysis results showed positive relationship between the two variables.

The analyses discussed above have successfully tested and supported the hypotheses except for H1 and H3. The first hypothesis, *H1: There is a significant relationship between information quality and user satisfaction;* is not supported since its regression significance level is more than the selected significant level of 0.05 and the correlation analysis shows a weak positive relationship between the two variable (r = 0.223). There is lack of support for *H3: There is a significant*

relationship between service quality and user satisfaction; as the correlation analysis shows a weak positive relationship between the two variables (r = 0.222). Further analysis to test H3 using regression analysis indicated an insignificant relationship between service quality and user satisfaction (significance value is 0.813 which is more than p= 0.05). There is only hypothesis #2, *H2: There is a significant relationship between system quality and user satisfaction*; was supported as the relationships between the variables were statistically significant (significance value is 0.000 which is less than p=0.05). Furthermore, the Pearson Correlation showed a medium positive relationship between two variables (r = 0.487).

4.4.2 Correlations between the perceived importance of IS effectiveness and the actual performance of IS (surrogate for end-user satisfaction)

Based on the computed output in Appendix 1 (Table A3), the value of R = 0.539 indicates that the strength of the relationship between the independent and dependent variables is moderate. The R^2 value of 0.290 suggests that only 29% of the variance in actual performance is explained by the perceived importance of IS effectiveness. This deduces that 71% of the variance in actual performance is explained by other variables not included in this study. Additionally, the value of adjusted R^2 at 0.285 indicates that merely 28.5% of the actual performance in the population is explained by the perceived importance of IS effectiveness.

To examine the significance of this relationship, the F value in the ANOVA table as per enclosed in Appendix 1 (Table A4) is observed. An F value of 52.273 (> 3) at a significance level of p= 0.000 indicates that the result is significant and that the model is good fit.

This conclusion is also supported by Pearson's Correlation test confirming a moderate positive relationship between the perceived importance of IS and the actual performance. The computed r = 0.539 is significant at p = 0.000, as shown in Table 4.6.

As such, there is sufficient statistical evidence to support hypothesis #4; and conclude that there is a significant relationship between the perceived importance of IS effectiveness and the actual performance of IS.

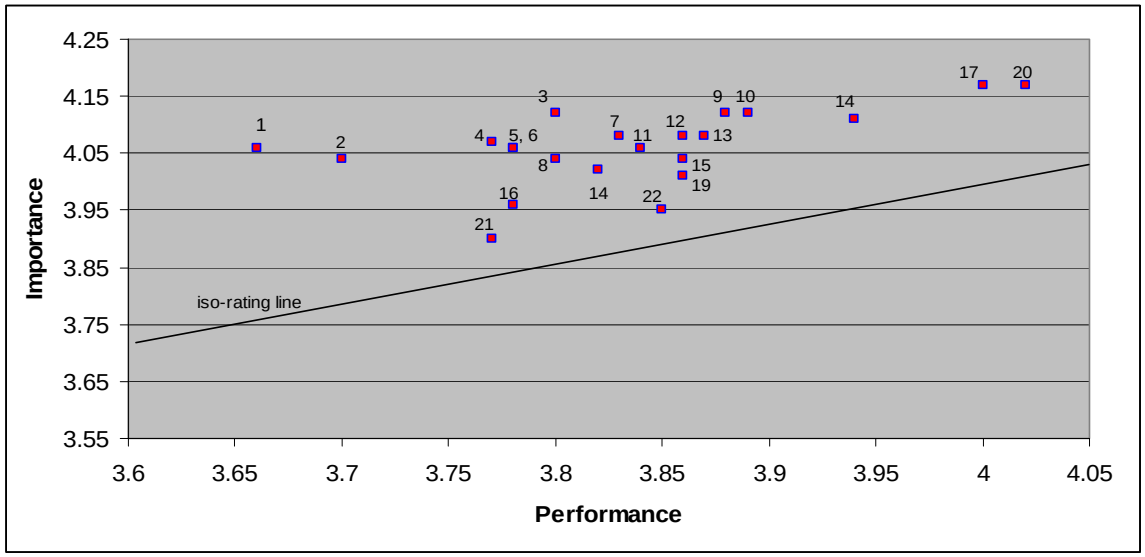
4.4.3 Association between the demographic factors and the actual performance of IS

Based on the computed output in Appendix 1 (Table A5), the value of R = 0.126 indicates that the strength of the relationship between the independent and dependent variables is very weak. The R^2 value of 0.016 suggests that only 1.6% of the variance in end-user satisfaction is explained by the demographic variables in this sample i.e. age, job designation and duration of employment (tenure). This deduces that 98.4% of the variance in end-user satisfaction is explained by other variables not included in this study.

To examine the significance of this relationship, the F value in the ANOVA table as per enclosed in Appendix 1 (Table A6) is observed. An F value of 0.740 (< 3) at a significance level of p= 0.530 indicates that the result is not significant and that the model is a poor fit. As such, it can be concluded that there is no significant association between the chosen demographic factors and the level of IS performance.

4.5 Importance-Performance Analysis

Mean scores for both importance and performance data were plotted as coordinates on the IP map. The resulting position on the grid is shown in Figure 4.1 below.



Legend for IS attributes

1 Able to provide precise information	2 IS is up-to-date
3 Knowledgeable staff	4 Information contents meet user needs
5 IS is efficient	6 Understand user needs
7 IS is effective	8 Able to provide reports exactly user needs
9 IS provide clear information	10 IS meets my job needs
11 IS provide sufficient information	12 Perform services right the first time
13 Overall, I'm satisfied with the system used	14 IS is accurate
15 IS is easy to use	16 IS easy to learn
17 ICT staffs are always willing to help	18 Sincere interest in solving problems
19 IS is in a useful format	20 Consistency courtesy
21 IS is adaptable for user	22 IS easy to become skilful

Figure 4.1

Importance-Performance Map of Pahang State Education Department IS Attributes

As mentioned previously, performance and importance scores provide more meaning when they are studied together. It is not enough to know which attribute was rated most important, or which one fared the best or worst. Mapping these scores against the iso-rating line shows how whether focus and resources are being deployed adequately, insufficiently or too lavishly. All the attributes fall in the second quadrant thus showing that existing systems are efficient. Nevertheless, the distribution of the items above the iso-rating indicates importance exceeds performance. Hence these are opportunities for the organization to improve.

As seen in Table 4.7 below, all attributes are performing well below expectations or their level of importance (negative values gap). However, to prioritize focus and effort, we look at the gap scores which are listed below in descending order:

IS Attributes	Performance (X)	Importance (Y)	Gap (X-Y)
Able to provide precise information	3.66	4.06	-0.40
IS is up-to-date	3.70	4.04	-0.35
Knowledgeable staff	3.80	4.12	-0.32
Information contents meets user needs	3.77	4.07	-0.30
IS is efficient	3.78	4.06	-0.28
Understand user needs	3.78	4.06	-0.28
IS is effective	3.83	4.08	-0.25
Able to provide reports exactly user needs	3.80	4.04	-0.24
IS provide clear information	3.88	4.12	-0.24
IS meets my job need	3.89	4.12	-0.23
IS provide sufficient information	3.84	4.06	-0.23
Perform services right the first time	3.86	4.08	-0.22
Satisfied with the system used	3.87	4.08	-0.21

Table 4.7

Mean and gap scores for Pahang State Education Department IS attributes

IS Attributes	Performance (X)	Importance (Y)	Gap (X-Y)
IS is accurate	3.82	4.02	-0.20
IS easy to use	3.86	4.04	-0.18
IS easy to learn	3.78	3.96	-0.18
ICT staffs are always willing to help	4.00	4.17	-0.17
Sincere interest in solving problems	3.94	4.11	-0.17
IS is in a useful format	3.86	4.01	-0.15
Consistently courtesy	4.02	4.17	-0.15
IS is adaptable for user	3.77	3.90	-0.13
IS easy to become skilful	3.85	3.95	-0.10

Table 4.7 continued

Mean and gap scores for Pahang State Education Department IS attributes

From the gap scores, it is apparent that there is insignificant different between performance and importance for all the IS attributes with the gap values below -1. This result shows that generally all end-users are satisfied with the systems they used and also with all the IS attributes presented.

However, the IS department needs to work harder at improving the system in order to be able to provide up-to-date and precise information and also needs to improve further the level of knowledge of the ICT staffs regarding to the systems. These three items which are having the highest gap scores indicate the biggest discrepancy between importance and performance. This is also maybe due to the fact that it is highly challenging to change the older system used particularly in public sectors.

With limited budget for IT and IS empowerment, Government's approval is compulsory before new systems can be implemented with discretion of annual budget. In addition, the technical and human error during input process has reduced the precision of information gathered by the system. Besides, lack of proper training of the ICT staffs has also become one of the reasons behind the high discrepancy for knowledgeable staffs.

On the other hand, the items with the lowest gap scores suggest that the current performance levels are manageable, even if they are still below end-users' expectations. It shows that the existing system is easy to use and learn, and highly adaptable for end-user. Furthermore, end-users are also satisfied with the courtesy of ICT staffs when performing their jobs.