Chapter 4 Results and Analysis

This chapter presents the findings of the survey that was conducted among nine banks. For Section A to D, all nine questionnaires were collected. This group represents the top management group and as previously explained each of these nine questionnaires represents the practice of the nine banks. All the questionnaires were duly completed and plug value was not used in any of the questionnaire.

For Section E, out of the 185 questionnaires distributed, 127 were returned, which equals to a return rate of 68.65%. All 127 questionnaires were checked for missing values and based on the 25% quota, plug values were used on a total of 16 questionnaires.

The results were analyzed and interpreted specifically to answer the research questions listed in paragraph 1.4. The results are tabulated according to the major topics such as characteristics of the respondents, evaluation methodologies used, choice of evaluation methods for different types of system and choice of evaluation methods among various groups of stakeholders.

4.1 Characteristics of the respondents

Respondents for Section A to D consist of two major groups. As tabulated in Table 4.1, five are Head of the IS Division and the remaining four are Senior Manager of the IS Division in the bank.

Position in IS Division	Frequency	Percentage
Head of Division	5	55.55%
Senior Manager	4	44.44%
Total	9	100%

Table 4.1 : Position in the bank (n=9)

For Section E of the questionnaire, the results in Table 4.2 showed that 17.3% are those with Accountancy degree, 48% with Computer Science degree and the remaining 34.6% with other degrees such as Business and Banking studies. This show that the majority of the stakeholders involved in IS/IT evaluation has qualification in computer science.

Type of qualification	Frequency	Percentage
Accountancy	22	17.3%
Computer Science	61	48.0%
General (Business,etc)	44	34.6%
Total	127	100%

Table 4.2 : Qualification of stakeholders (n=127)

Tabulations were also done for the stakeholders in accordance to the roles they play in the ongoing IS/IT project of which they are involved. The results are shown in Table 4.3 below :-

Role	Frequency	Percentage
Project Manager	36	28.3%
System	37	29.1%
Finance	7	5.6%
Support	23	18.1%
Users	24	18.9%
Total	127	100%

Table 4.3 : Roles of stakeholders (n=127)

The results confirm that stakeholders do consist of various groups and they play different roles in the IS evaluation exercise. The Project manager or Champion and the system people form the largest percentage (28.3% and 29.1% respectively). This indicate that most IS/IT evaluation exercise involve the project manager and the system people when compared with other groups.

4.2 Evaluation Practices

For the purpose of the survey, the life cycle of system development is divided into three phases, which were easily understood by the respondents: feasibility, development and post implementation evaluation stages. The respondents make considerable use of evaluation at the feasibility stage, where virtually everybody ticked "always" or "often". As can be seen, the use of evaluation studies declines over the remaining stages (Table 4.4) :-

	Always	Often	Sometimes	Never	Total
Feasibility	88.9%	11.1%	0%	0%	100%
Development	33.3%	0%	44.4%	22.3%	100%
Post-implementation	33.3%	33.3%	22.2%	11.2%	100%

Table 4.4 : Frequency of Evaluation Practices (n=9)

Between development and post-implementation evaluation stages, there are more respondents performing post-implementation evaluation than during the system development stage. From the means scores tabulated in Table 4.5 below, the results showed that post-implementation evaluation is more frequently conducted than evaluation during system development stage.

	N	Minimum	Maximum	Mean	Std. Deviation
Feasibility	9	3	4	3.89	.33
Development	9	1.00	4.00	2.4444	1.2360
Post implementation	9	1.00	4.00	2.8889	1.0541
Valid N (listwise)	9				

Table 4.5 : Evaluation Practices (n=9)

4.2.1 Evaluation Methods

Within each stages of evaluation, mean scores for the ten methods are computed and ranking is done to determine the most common evaluation methods used for each of the stages. Results are tabulated in Table 4.6 as follows :-

Methods	Feasibility		Development		Post-implementation	
	Mean	Rank	Mean	Rank	Mean	Rank
Cost-Revenue	2.0000	1	1.0000	4	1.5556	1
ROI	1.6667	4	1.0000	4	1.4444	2
Cost-benefit	1.8889	2	1.1111	3	1.4444	2
ROM	1.2222	6	1.1111	3	1.2222	3
Spending Ratios	1.2222	6	1.1111	3	1.2222	3
IE	1.2222	6	1.1111	3	1.1111	4
MOMC	1.5556	5	1.2222	2	1.2222	3
Value analysis	1.7778	3	1.1111	3	1.2222	3
CSF	1.5556	5	1.4444	1	1.4444	2
Experimental	1.1111	7	1.2222	2	1.0000	4

Table 4.6 : Evaluation methods (n=9, minimum=1,maximum=2)

Based on the maximum mean value of 2 and a minimum of 1, the results show that cost-revenue analysis and cost-benefit analysis are two of the most popular methods of evaluation during feasibility stage and as well as post implementation stage. For development stage, there is a preference for non-financial methods as CSF (Critical Success Factor) and MOMC (Multi objective multi criteria) were ranked first and second.

To provide a clearer analysis, the data is transformed and average means of financial and non-financial methods were calculated for each stage of evaluation.

The results for preferred methodologies during feasibility, development and post implementation stages for those who perform the evaluation are tabulated in Table 4.7 below :-

Methods	Feasibility	Development	Post-implementation
Financial methods	1.5370	1.0952	1.3333
Non-financial methods	1.5000	1.3214	1.2500

Table 4.7 : Financial vs Non-financial methods of evaluation

From the mean scores recorded, it is concluded that the use of financial methods is preferred for feasibility and post-implementation stages of evaluation. However, during development stage of evaluation, non-financial methods are preferred.

4.3 Choice of evaluation methods for different type of systems

Mean scores (minimum score=1 and maximum score=5) for each of the ten methods relating to the four different system types were tabulated in Table 4.8 as follows :-

Method	Mandatory system	Value adding system	Strategic system	Business transformation system
Cost revenue	3.6667	4.0000	3.6667	4.2222
ROI	3.3333	3.6667	3.2222	3.8889
Cost benefit	4.2222	4.6667	4.1111	4.2222
ROM	2.1111	2.5556	2.7778	2.8889
Spending ratio	2.4444	2.5556	2.5556	2.6667
IE	2.6667	2.6667	2.7778	3.1111
MOMC	3.4444	3.2222	3.3333	3.6667
Value analysis	3.6667	4.0000	4.2222	4.2222
CSF	3.6667	3.7778	4.3333	4.2222
Experimental	2.3333	2.3333	2.7778	3.0000

Table 4.8 : Methods and system type (n=9)

Shaded areas in the table shows the highest mean score recorded and therefore the most preferred method/(s) of IS evaluation practice. For mandatory system, the respondent indicated cost benefit analysis as the most important method. Similarly for value adding type of system, cost benefit analysis is considered most important. However for strategic system, CSF (Critical Success Factor) method is considered most important. Finally for business transformation type of system, there are four methods that scored the same means; they are cost revenue and cost benefit analysis for financial methods, and value analysis and CSF for non-financial method.

Data is further transformed to compute average means for financial and non-financial methods for each of the four systems. A comparison can then be made to reveal preferences of the respondents. Table 4.9 tabulated the results as follows :-

Method	Mandatory system	Value adding system	Strategic system	Business transformation system
Financial	3.0741	3.3519	3.1852	3.5000
Non-financial	3.2778	3.3333	3.6667	3.7778

Table 4.9 : Financial vs Non-financial methods for system type (n=9)

The Project ladder theory (Farbey et al 1993) is confirmed here. The preference or importance of using non-financial methods goes higher as the type of project moves higher up the ladder. The use of non-financial methods gains importance as the system moves towards strategic or business transformation type.

However, for mandatory system, the highest mean score was computed for cost benefit analysis but the average mean score for financial method is lower than non-financial method. While it is true that quantification of cost and benefit is most important for mandatory system, thus confirming the Project Ladder theory, however, the respondents also indicated that non-financial methods are equally important.

In the case of value adding type of system, according to the Project Ladder theory, simulation and experimentation is important but in practice, these methods are not considered crucial. In fact with mean scores of less than 3, these methods are considered not important (code 2=not important) by the respondents.

4.4 Choice of evaluation methods for different groups of stakeholders

Section E was distributed among different groups of project team members to determine their perceived importance among the ten methods of IT evaluation. The mean scores and standard deviation is tabulated in Table 4.10 as follows :-

Method	N	Minimum	Maximum	Mean	Std. Deviation
Cost revenue	127	1.00	5.00	3.7677	.7632
ROI	127	1.00	5.00	2.8543	1.0062
Cost benefit	127	1.00	4.67	3.0262	.8063
ROM	127	1.00	5.00	3.3858	1.0161
Spending ratio	127	1.00	5.00	3.2126	1.0437
IE	127	1.00	5.00	3.4252	.8999
MOMC	127	1.00	5.00	3.7979	.7079
Value adding	127	1.50	5.00	3.8307	.6732
CSF	127	1.00	5.00	3.9528	.8829
Experimental	127	1.00	5.00	3.5630	.8953

Table 4.10 : Evaluation methods among stakeholders (n=127)

The most important method (highest mean score) indicated by the respondents is the Critical Success Factor method. The data is further transformed to obtain average mean scores for financial and non-financial methods. The results are tabulated in Table 4.11 below :-

Method	N	Minimum	Maximum	Mean	Std. Deviation
Financial	127	1.00	4.94	3.2787	.7113
Non-financial	127	1.29	5.00	3.7805	.5753

Table 4.11 : Mean scores for financial and non-financial methods

The mean score for non-financial methods is higher and therefore it can be concluded that overall the stakeholders perceived that the uses of non-financial methods are more important than financial methods.

To investigate if there is any difference between perception of importance on evaluation methods among stakeholders of different qualification, the mean

scores for the financial and non-financial methods are tabulated in Table 4.12 and Table 4.13 below:-

Qualification	N	Minimum	Maximum	Mean	Std. Deviation
Accounting	22	1.72	4.94	3.5821	.7626
Information System	61	1.33	4.5	3.1389	.5901
General	44	1.00	4.61	3.3207	.7896

Table 4.12: Mean and standard deviation for **financial** methods among stakeholders with different types of qualification

Qualification	N	Minimum	Maximum	Mean	Std. Deviation
Accounting	22	1.46	5.00	3.9716	.7446
Information System	61	1.29	4.83	3.7336	.5185
General	44	2.00	4.88	3.7500	.5486

Table 4.13: Mean and standard deviation for **non-financial** methods among stakeholders with different types of qualification

The results shown in Table 4.12 and Table 4.13 indicate that there are differences in the "perceived level of importance" on IS evaluation methods among stakeholders, who have different qualification. The mean scores for the three groups of stakeholders are different and those with Accounting qualification recorded highest mean scores for both financial and non-financial methods. In one way, this supports the view that professionals do not believe that one type of method is sufficient to address the complex issue of IS evaluation (Farbey et al 1993). Nevertheless, further inference from the means scores are required to examine if the difference is indeed significant among the various group of stakeholders.

Therefore, One-way ANOVA between groups statistical test is performed to determine if there is significant difference in the perceived level of importance for financial and non-financial methods among stakeholders with different qualification. The results of the test is tabulated in Table 4.14 and Table 4.15 below:-

	Sum of Squares	Df	Mean Squares	F	Sig.
Between Groups	3.295	2	1.647	3.379	.037
Within Groups	60.455	124	.488		
Total	63.750	126			

Table 4.14: One-way ANOVA for difference in the mean for **financial** methods among the three groups of stakeholders with different qualification

Using the one way ANOVA between groups statistical test for financial methods, the observed significance level, known as p value, is equal to 0.037 at the confidence level of 0.05. With the p value<0.05 it is concluded that qualification has significant influence on perception of importance on the usage of financial methods. This confirms the theory on mental models (Symons 1994 and Senge 1994). Those with Accounting degree place more importance on the usage of financial methods when compared with stakeholders of other qualifications.

For non-financial methods, the results are shown in Table 4.15 below :-

	Sum of Squares	Df	Mean Squares	F	Sig.
Between Groups	.978	2	.489	1.490	.229
Within Groups	40.718	124	.328		
Total	41.696	126			

Table 4.15: One-way ANOVA for difference in the mean for **non-financial** methods among the three groups of stakeholders with different qualification

The p value equals 0.229 (>0.05) at a confidence level of 0.05, concludes that there is no significant difference in the perceived level of importance for the usage of non-financial methods among stakeholders with different qualification.

Besides qualification, another form of classification among stakeholders is the difference in their roles. In accordance to the internal stakeholder map (Farbey et al 1993) shown in Figure 2, stakeholders can be classified into five major categories, each playing specific roles. Based on these five major roles, the mean scores on the perceived level of importance on the usage of financial and non-financial methods are tabulated in Table 4.16 and Table 4.17 below :-

Role	N	Minimum	Maximum	Mean	Std. Deviation
Project Manager	36	1.67	4.5	3.3627	.5793
System	37	1.69	4.06	3.0353	.5323
Finance	7	2.67	4.94	3.8770	.7280
Support	23	1.00	4.61	3.3176	.9324
Users	24	1.33	4.44	3.3160	.7934

Table 4.16: Mean and standard deviation for **financial** methods among stakeholders of different roles

Role	N	Minimum	Maximum	Mean	Std. Deviation
Project Manager	36	1.29	4.46	3.6389	.5360
System	37	3.04	4.46	3.8063	.3219
Finance	7	3.67	5.00	4.1905	.4589
Support	23	2.00	4.83	3.9891	.7242
Users	24	1.46	4.88	3.6337	.7122

Table 4.17: Mean and standard deviation for **non-financial** methods among stakeholders of different roles

The results in Table 4.16 and Table 4.17 show that the mean scores on the perceived level of importance on the usage of financial and non-financial methods vary among the stakeholders. To further infer if the difference in means is significant among the stakeholders who are classified according to their roles

in the IS evaluation process; One-way ANOVA statistical test between groups is performed. The results are tabulated in Table 4.18 and Table 4.19 below :-

	Sum of Squares	Df	Mean Squares	F	Sig.
Between Groups	5.020	4	1.255	2.607	.039
Within Groups	58.73	122	.481		
Total	63.75	126			

Table 4.18: One-way ANOVA for difference in the mean for **financial** methods among the five groups of stakeholders with different roles

	Sum of Squares	Df	Mean Squares	F	Sig.
Between Groups	3.442	4	.860	2.744	.032
Within Groups	38.254	122	.314		
Total	41.696	126			

Table 4.19: One-way ANOVA for difference in the mean for **non-financial** methods among the five groups of stakeholders with different roles

Using One-way ANOVA statistical test between groups, the observed significance level, p=0.039 (<0.05) at the confidence level of 0.05, confirms that there is significant difference in the perception on the level of importance for the usage of financial methods among stakeholders of different roles. Similarly, the p value of 0.032 (<0.05) at the confidence level of 0.05, confirms that stakeholders with different roles differ in their perception of the level of importance in the usage of non-financial methods.

The findings is consistent with the stakeholder concept that different groups hold different perceptions about the importance of a given measurement process for evaluating IS (Walsham 1993; Farbey et al 1993; Palvia et al 2001). Therefore, it is concluded that the choice of evaluation methods is significantly different among the various groups of stakeholders who play different roles in the IS evaluation exercise.