CHAPTER 4

DATA ANALYSIS

4.1 Testing for Reliability and Factor Analysis

This section describes the data gathered from the 125 respondents of the MSC status companies and analysed using the Statistical Package for the Social Sciences (SPSS) Version 10.0 software. In this quantitative data analysis, the researcher used a variety of statistical analyses, involving both descriptive and inferential techniques.

4.1.1 Reliability Test

In this study, an internal reliability of different sections of the variables was assessed using the Cronbach's alpha technique. Table 4.1 shows the results of the reliability analysis for each item on the interval scale.

Table 4.1
Reliability Coefficients (Cronbach's alpha) Per Categorical Variable

Categorical Variables	No.of Items	No.of Cases	Cronbach's Alpha
Information technology-related competencies	13	125	0.9140
Multimedia-related competencies	8	125	0.9047
Knowledge management competencies	5	125	0.9325
Management skills	8	125	0.8864
Interpersonal and communication skills	11	125	0.8777
Entrepreneurial skills	7	125	0.8969
Research skills	5	125	0.9207
Personal qualities	29	125	0.9606

The results of the reliability analysis for each categorical variable on the scales showed high reliability coefficients that ranged between 0.8777 for interpersonal and communication skills to 0.9606 for personal qualities. In this study, coefficients of 0.8 and above were considered very reliable, hence it could be concluded that the items in the questionnaire had high internal consistency and reliability.

4.1.2 Factor Analysis

Factor analysis is a group of statistical techniques that *"helps researchers construct indexes, test the unidimensionality of scales, assign weights to items in an index, and statistically reduce a large number of indicators to a smaller set"* (Neuman, 2000:502). A factor analysis would show which groups of variables were closely related and may end up with three or four major factors, which grouped similar disciplines together (Burns, 2000b:272).

In this study, factor analysis statistic was performed on 29 variables of the personal qualities section to explore the relationships among the 29-scaled personal qualities variables. Factor analysis began with the calculation of the inter-variable correlation matrix. A 29x29 correlation matrix was generated and a factor analysis was performed. The analysis proceeded to identify the set of underlying linear traits that was best implied by the inter-variable relationships. It extracted the eigenvalue to represent each underlying factor sequentially. The eigenvalue became smaller as each factor was extracted. Thus, the first factor extracted had a relatively large eigenvalue and the next factor a smaller value. As shown in Table 4.2, those solutions with eigenvalues more than one were selected. The five eigenvalues extracted were 14.413, 1.986, 1.424, 1.252 and 1.134. The resulting structure is reported in Table 4.2.

To increase interpretability, the factor solutions were rotated using a method called varimax orthogonal rotation. The factors that emerged from the factor analysis were then interpreted and labelled to describe the characteristics of the personal qualities. Only those items having factor loadings with a value at 0.40 (an accepted convention in this kind of analysis) were treated as significant. Table 4.2 examined the results of the rotated component matrix showing the eigenvalues and factor structure of the 29

variables of personal qualities. Indicators loading at 0.40 or higher, which is a commonly accepted measure of significance, are highlighted in this table.

Table 4.2
The Eigenvalues and Factor Structure of Personal Qualities

Variables	Factors				
	1	2	3	4	5
Ability to accept pressure	**0.728**	9.336E-03	0.177	0.363	6.100E-02
Optimistic	0.232	0.111	0.386	**0.585**	0.323
Works well in a team	**0.731**	0.113	0.283	0.138	-6.800E-03
Good communication skills	0.168	**0.612**	0.352	0.218	0.152
Ability to think critically	0.248	0.468	0.398	**0.482**	8.591E-02
Visionary with long range goals	0.118	0.111	**0.678**	-2.190E-02	0.532
Open-minded	**0.507**	0.461	0.369	0.209	2.425E-02
Ability to perform multi-tasks	0.562	0.190	**0.581**	5.505E-02	0.102
Shows high level of confidence	0.399	0.188	0.280	0.355	**0.479**
Receptive to new ideas	**0.632**	0.217	0.227	0.366	0.215
Flexible and able to adapt to changes	**0.696**	0.120	0.337	0.404	6.403E-02
Energetic, dynamic, outgoing	**0.578**	0.280	0.435	0.243	3.020E-02
Seeks challenges	0.337	0.282	**0.691**	0.381	9.126E-02
Seeks opportunities	0.260	0.384	**0.713**	0.222	0.136
Sees the big picture	0.163	0.153	**0.717**	0.322	0.241
Takes calculated risks	0.242	0.307	0.486	0.178	**0.605**
Self-starter	0.378	0.196	0.113	0.162	**0.739**
Life-long learner	0.255	0.297	0.204	**0.616**	0.184
Pleasant manner	0.266	**0.688**	0.122	0.279	0.217
Dedicated to work	0.348	0.318	6.298E-02	**0.672**	0.194
Creative and innovative	0.240	0.271	0.281	**0.662**	9.496E-02

Table 4.2, continued

Works independently	**0.680**	0.136	1.237E-02	0.288	0.270
Responsible and reliable	**0.747**	0.387	4.620E-02	-2.504E-02	0.229
Create mutual respect and trust	0.579	**0.581**	0.140	-0.169	0.218
Self-motivated	**0.718**	0.256	0.151	0.275	0.334
Emotionally stable	0.220	0.466	5.625E-02	**0.487**	0.357
Has sense of humour	0.220	**0.605**	0.158	0.248	0.187
Friendly	8.028E-02	**0.791**	0.240	0.292	0.180
Committed to customer service	-5.084E-02	0.299	0.190	0.299	**0.586**
Eigenvalues	14.413	1.986	1.424	1.252	1.134
% of Variance	49.7	6.847	4.911	4.316	3.912

Note. Extraction method: Principle Component Analysis
Rotation method: Varimax with Kaiser Normalisation

Table 4.2, indicates the factor analysis produced five underlying factors or dimensions. Each factor was represented as a column of numbers. Each number was considered as a loading and described the weight that each item had on the factor. It can be seen that variables loaded on one factor did not load heavily on the other factors. In this table, *ability to accept pressure* (0.728), *works well with others in a team* (0.731), *open-minded* (0.507), *receptive to new ideas* (0.632), *flexible and able to adapt* to *changes* (0.696), *energetic, dynamic and outgoing* (0.578), *works independently* (0.680), *responsible and reliable* (0.747), and *self-motivated* (0.718) were variables that loaded heavily on the first factor, did not load on any other factors.

Based on the five factors derived from the factor analysis procedure, the characteristics of the personal qualities were grouped and a name or label was assigned to it. The first dimension was labelled as "Dynamic and Responsible" and it included the most number of variables, namely *ability to accept pressure, works well with others in a team, open-minded, receptive to new ideas,* and *flexible and able to adapt to*

changes. Energetic, dynamic and outgoing was also present as a variable in this dimension, as was *works independently. Responsible and reliable*, as well as *self-motivated* were also in this dimension. As could be seen in this table, the loadings of variables for this dimension ranged from 0.747 to 0.507 with an eigenvalue of 14.413 and percentage of variance of 49.7.

The second dimension grouped together the characteristics of an individual who has the ability to interact with other people. Thus, it was labelled as "Ability to interact with all levels of people." Variables like *has good communication skills, pleasant manner,* and *creates mutual respect and trust* belonged to this dimension. *Has sense of humour* and *friendly* seemed also to correlate well in this dimension. As shown in Table 4.2, the loadings of variables for this dimension ranged from 0.791 to 0.581 with an eigenvalue of 1.986 and percentage of variance of 6.847.

The third dimension was labelled as "sees the big picture." The table shows that this dimension had a high loading on *sees the big picture* (0.717) and *seeks opportunities* (0.713). Related to these two variables were *visionary with long-range goals, able to perform multi-tasks,* and *seeks challenges*. The loadings for these variables ranged from 0.717 to 0.581 with an eigenvalue of 1.424 and percentage of variance of 4.911.

For the fourth dimension, although the variable *creative and innovative* ranked as the second highest loading (0.662), the researcher felt that is was most appropriate to label this dimension as "creative and innovative." Closely associated with this variable was *a life long learner* and *dedicated to work*. Being *optimistic* and *able to think critically* were also loaded in this dimension. *Emotionally stable* that had the second lowest loading (0.487) also occurred in this dimension. As shown in Table 4.2, the

loadings for the variables in this dimension ranged from 0.672 to 0.482 with an eigenvalue of 1.252 and percentage of variance of 4.316.

The fifth dimension was labelled as "confidence and commitment" which was composed of four variables. This dimension included *shows high level of confidence, takes calculated risk,* and *self-starter* that had the highest loading (0.739). Unexpectedly, *committed to customer service* which did not correlate well with other variables was found to be acceptably related to variables in this dimension. From the table, it shows that the loadings for the variables in this dimension ranged from 0.739 to 0.479 with an eigenvalue of 1.134 and percentage of variance of 3.912.

As stated earlier, there are two methods in choosing how many factors to extract. Earlier the researcher had presented the "Kaiser method" as the first method in which only factors that had an eigenvalue of greater than one were chosen. The second method was to apply the graphical "scree test" whereby the factors to be extracted were those that lie before the eigenvalues seemed to level off. The graphical presentation of the scree test for this study is shown in Figure 4.1. The graph shows clearly that the eigenvalues of the factors retained using this method were also greater than one.

Figure 4.1: The Scree Test for 29 Personal Qualities Variables
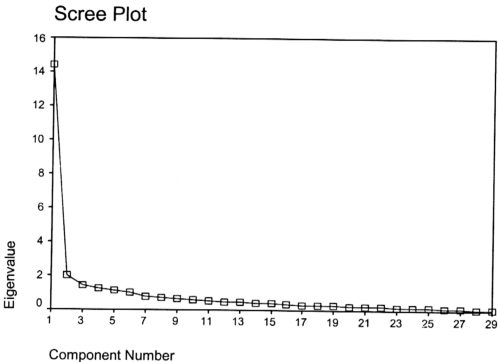
4.2 Profiles of Respondents

4.2.1 Company Information

This section presents the characteristics of the respondents in this research.. A total of 125 (35%) returned questionnaires were analysed from a total population of 360 MSC status companies of the Malaysian Multimedia Super Corridor.

Table 4.3 shows the general information about the MSC status companies involved in this study.

Table 4.3
General Information about the MSC Status Companies ($n = 125$)

Group of Companies ($n = 125$)	Frequency	Valid Percentage
System Integration	64	51.2
Creative Multimedia Cluster	38	30.4
Internet-based Business	23	18.4
Total	125	100.0
Shareholder Type ($n = 121$)		
Malaysian	76	62.8
Foreign	45	37.2
Total	121	100.0
No response	4	
Venture Status ($n = 125$)		
Non-joint venture	75	60.0
Joint-venture	31	24.8
Others	19	15.2
Total	125	100.0
Years of Operation ($n = 124$)		
<5 years	89	71.8
5 to 10 years	25	20.2
11 to 15 years	6	4.8
16 to 20 year	2	1.6
>20 years	2	1.6
Total	124	100.0
No response	1	
Year received MSC Status ($n = 118$)		
2000	36	30.5
1998	28	23.7
1999	25	21.2
1997	15	12.7
2001	12	10.2
1995	2	1.7
Total	118	100.0
No response	7	
Flagship Application ($n = 122$)		
Borderless marketing	29	23.8
R&D clusters	22	18.0
Electronic government	20	16.4
World-wide manufacturing web	12	9.8
Smart school	12	9.8
Multi-purpose card	9	7.4
Telemedicine	7	5.7
Total	122	100
No response	3	
Turnover in 1999 ($n = 119$)		
< RM 10 mill.	58	48.7
RM 10 mill. to < RM 50 mill.	22	18.5
RM 50 mill. to < RM 100 mill.	3	2.5
> RM 100 mill.	3	2.5
Not applicable	33	27.7
Total	119	100.0
No response	6	

This study involved a total of 125 companies, which are grouped according to their related business or nature of the company. System Integration (SI) companies form the first group comprising Computer/System Security, Hardware/Electronics, Software development, System integration, and Telecommunication. The Creative Multimedia Cluster (CMC) forms the second group comprising of companies involved in Consultancy, Content development, Education/Training/Consultancy, and Production/Post Production and Animation. The third group of companies was grouped as Internet-based Business (IBB) that belonged to the Internet-based business corporations which were involved in Application service provider, Web-hosting, web/online publishing, and E-Commerce service/Solution. The majority of the companies belonged to the System Integration group of companies.

The result shows that Malaysian shareholder companies constitute more than the foreign shareholder companies. The foreign shareholder types of companies comprise companies from USA/Canada, Europe, Australia, British Virgin Island, Bahamas, Japan and Singapore.

The findings revealed that 60.0% of the companies fell under the non-joint venture status companies, 24.8% were joint-venture status companies, while 15.2% were others. Among the 'others' category mentioned by the respondents were: subsidiary of public listed company, wholly owned subsidiary company, private company, and government body.

This question listed five sets of time frame of companies' operation ranging from less than 5 years, 5 to 10 years, 11 to 15 years, 16 to 20 years, and more than 20 years. The majority (71.8%) of the companies sampled had been operating less than 5 years indicating that they were new start-up companies. Only 10 companies had operated 10 or more years.

Although some companies had been operating and established for quite sometime, others were companies just starting-up, and this is indicated from the date they received the MSC status.

About 62% (72) of the companies obtained their MSC status in the last three years (1999-2001), while the rest obtained their status between 1995 and 1998.

The Malaysian government is a great supporter of electronic transaction such as e-business and e-commerce. Thus, these flagship applications were introduced within the Multimedia Super Corridor. Most activities of the MSC status companies were based on flagship applications. Table 4.3 shows the distribution of companies by their flagship applications.

The findings indicate that about 58% (71) of the companies were involved in borderless marketing, R&D clusters and electronic government. The rest were involved in world-wide manufacturing web, smart school, multi-purpose card and telemedicine.

The size of the companies was measured by its turnover and this is indicated in Table 4.3. Table 4.3 reveals that the majority of the companies had a turnover of less than RM10 million or 48.7%. Twenty-two or 18.5% of the companies had a turnover of RM10 million to less than RM50 million. Companies that fell within the range of turnover between RM10 million to less than RM50 million and between RM50 million to less than RM100 million constituted only three or 2.5%, while 33 or 27.7% marked as not applicable that either meant that respondents did not want to reveal or did not seem to know their 1999 turnover.

4.2.2 Employee Information

The number of employees reflects the size and strength of a company. Table 4.4 shows the distribution of companies by a range of number of employees.

Table 4.4
Personnel Information

No. of Employees ($n = 124$)	Frequency	Valid Percentage
Below 20	57	46.0
21-50	34	27.4
51-100	19	15.3
101-150	5	4.0
151-200	5	4.0
201-250	2	1.6
251-300	1	0.8
351 and above	1	0.8
Total	124	100.0
No response	1	
No. of IPs Employed (($n = 125$))		
Below 20	82	66.1
21-50	25	20.2
51 and above	17	13.7
Total	124	100.0
No respond	1	
Existence of Post		
No	79	63.2
Yes	46	36.8
Total	125	100.0

The majority of the companies (57) had less than 20 employees, indicating they were small companies. Thirty-four companies had 21-50 employees, while 19 had 51-100 numbers of employees. Over 2% of the companies had more than 200 employees.

In this study, it was also important to elicit information about the company's number of information professionals to identify information activities carried out in the companies. Information professionals in this study comprised of workers who were involved in information or content-related work, such as planning, creating, acquiring, evaluating, analysing, synthesising, organising, coordinating, controlling, processing, storing, retrieving, and disseminating information.

Table 4.4 indicates that, out of 124 companies that responded to the survey, 82 or 66.1% indicated that there were below 20 information professionals employed in their companies. Another 25 or 20.2% of the companies that participated had 21-50

information professionals in their companies.   It was also found that 17 or 13.7% of the companies had more than 50 information professionals.

The majority of the companies (79 or 63.2%) had no post in existence, which was responsible for the overall management of information. If there was a post in existence, respondents were asked for the name of the post. This is listed in Table 4.5.

Table 4.5
Name of Post

Name of Post (*n* = 125)	Frequency	Valid Percentage
Chief Technology Officer	12	9.6
Chief Information Officer	6	4.8
Chief Operating Officer	4	3.2
General Manager	3	2.4
Chief Executive Officer	3	2.4
Technical Director	1	0.8
Managing Director	1	0.8
Head, Solution Development	1	0.8
Senior Manager	1	0.8
Research Information Manager	1	0.8
Chief Knowledge Officer	1	0.8
Director of Technology	1	0.8
System Integration Manager	1	0.8
Assistant Manager, MIS	1	0.8
Information Technology Officer	1	0.8
Director	1	0.8
Information Architect	1	0.8
Training & System Manager	1	0.8
Technical Senior Vice President	1	0.8
Director of Corporate	1	0.8
Vice President of Marketing	1	0.8
(No Response)	2	1.6
(Not Applicable)	79	63.2
Total	125	100.0

The personnel responsible for handling information work in companies were named under various posts. About 21 posts were listed in Table 4.5. The 79 respondents who ticked "not applicable" were companies which did not have posts in existence for the overall management of information. The level of management where the Information Professional's post was placed was also asked in the questionnaire. Table 4.6 shows that two levels of management were identified.

Table 4.6
Distribution of Post by Level of Management

Level of Management (n = 46)	Frequency	Valid Percentage
Top management	37	80.43
Middle Management	9	19.57
Total	46	100.0

Companies that did not have a post responsible for doing management of information in their companies obviously marked "not applicable" for any level of management. About 80.43% of the companies placed the Information Professional's post at top-level management, 19.57% of the companies placed the post at middle management level.

Respondents were also asked if there was a plan to create the post in future. The information given by respondents revealed whether there were plans to create post such as Chief Knowledge Officer or Chief Information Officer in future. This question was not applicable to 43 companies because they had already stated that there was an existing post that was responsible for the overall management of information. For the other 71 companies, 47 or 66.2% of the companies have a future plan to create the post in future and 24 or 33.8% did not have a plan to create the post in future.

4.3 Information Technology-Related Competencies Ratings by Company Groupings

The respondents were asked on the level of importance of the required competencies on a basis of a seven-point interval scale, ranging from 1 as *not important at all* to 7 as *most important*. If the statements were not applicable, respondents were given a choice to mark the variable as "not applicable." In this study "not applicable" was coded as 9. In the analysis, companies were grouped according to its categories – System Integration group (SI), Creative Multimedia Cluster group (CMC), and

Internet–based Business (IBB) group. Variables were grouped according to seven major groups of competencies, which were: information technology, multimedia, knowledge management, management, interpersonal and communication, entrepreneurial, and research. The data from the 57 competencies were analysed for mean and standard deviation (*SD*). From the results of the analysis, the higher the mean value, the more important the stratum was for that competency. The competencies were arranged in rank order based on the mean important rating.

Table 4.7 shows that, for the System Integration group, the mean ranged from 6.39 to 3.95. Knowledge of basic computer technology had the highest mean (6.39), followed by, skills in using Internet technologies like the Internet/Intranet/Extranet (5.89), skills of using application software like word processing, desktop publishing, spreadsheet, graphics and presentation software (5.77), and ability to use programming languages (5.58). The rest of the IT skills achieved mean scores of below 5.5. The mean score for the overall required information technology-related competencies was 5.20, and a standard deviation of 0.95.

For the Creative Multimedia Cluster group, the means of importance ratings concerning the information technology-related competencies required of information professionals ranged from 6.24 to 3.95. First in rank, with the highest mean was knowledge of basic computer technology (6.24). This was followed by skills in using Internet technologies like the Internet/Intranet/Extranet (6.05), and skills of using application software like word processing, desktop publishing, spreadsheet, graphics and presentation software (6.03), knowledge of operating computer peripherals (5.42), and ability to handle major operating systems (5.18). The rest of the information technology skills achieved mean scores of below 5.0. The standard deviation for the competencies varied from 1.86 to 0.85. The mean score for the overall required

information technology-related competencies was 4.49, and a standard deviation of 1.10.

Table 4.7
Mean Scores on Information Technology-Related Competencies Ratings by Company Groupings

IT-Related Competencies	SI (n = 64)		CMC (n = 38)		IBB (n = 23)	
	Mean	Rank	Mean	Rank	Mean	Rank
Knowledge of basic computer technology	6.39	1	6.24	1	6.48	2
Skills in using Internet technologies	5.89	2	6.05	2	6.57	1
Skills of using application software	5.77	3	6.03	3	6.43	3
Ability to use programming languages	5.58	4	4.71	8	5.43	9
Ability to handle major operating systems	5.45	5	5.18	5	5.57	7
Knowledge of operating computer peripherals	5.36	6	5.42	4	6.13	4
Skills in systems maintenance, operating, installing and testing of systems	5.20	7	4.29	11	5.17	11
Abilities to design and develop DBMS	5.05	8	4.79	7	5.70	6
Skills of using project management tools	5.03	9	4.68	9	5.96	5
Ability to manage networked-based applications	5.02	10	4.63	10	5.30	10
Abilities to design and maintain a web-site	4.43	11	4.84	6	5.48	8
Abilities to repair and troubleshoot computers	4.34	12	4.08	12	4.78	12
Skills of using AI tools	3.95	13	3.95	13	4.65	13

System Integration = SI
Creative Multimedia Cluster = CMC
Internet-based Business = IBB

The means of importance ratings by the Internet-based Business group concerning information technology related competencies required of information professionals ranged from 6.57 to 4.65. The Internet/Intranet/Extranet had the highest mean, which was 6.57. This result was expected because of the nature of the business that has to do with Internet-based business. Following these skills were: knowledge of basic computer technology (6.48), skills of using application software like word processing, desktop publishing, spreadsheet, graphics and presentation software (6.43), knowledge of operating computer peripherals (6.13), skills of using project management tools

(5.96), abilities to design and develop DBMS (5.70), ability to handle major operating systems (5.57), and abilities to design and maintain a web-site (5.48). The last five skills achieved were mean scores of between 5.43 and 4.65. The standard deviation for the competencies varied from 2.11 to 0.77. The mean score for the overall required information technology-related competencies was 5.67, and a standard deviation of 1.06.

4.4 Multimedia-Related Competencies Ratings by Company Groupings

Section B of the questionnaire asked respondents to indicate the level of importance of the stated multimedia-related competencies for information professionals required by their companies. Table 4.8 indicates the mean of importance ratings of multimedia-related competencies for the three groups of companies – System Integration, Creative Multimedia Cluster, and Internet-based Business group of companies.

The System Integration group of companies indicates mean ratings which ranged from 5.02 to 3.23. Knowledge of content management and development was found to be the most important requirement with a mean of 5.02, followed by creative skills and use of graphic software (4.86), knowledge of scripting (4.83), knowledge of copyright laws, and multimedia programming and authoring which shared the same mean of 4.59. The last three variables were: digital image recording and processing (4.16), 3D modeling and animating (3.77) and music composing, synthesising and effects (3.23). The standard deviation for the multimedia-related competencies varied from 1.94 to 1.59 and the overall mean score was 4.38.

Table 4.8

Mean Scores of Multimedia-Related Competencies Ratings by Company Groupings

Multimedia-Related Competencies	SI (n = 64)		CMC (n = 38)		IBB (n = 23)	
	Mean	Rank	Mean	Rank	Mean	Rank
Knowledge of content management and development	5.02	1	5.18	2	5.61	2
Creative skills and use of graphic software	4.86	2	5.58	1	5.74	1
Knowledge of scripting	4.83	3	4.58	5	5.09	5
Knowledge of copyright laws	4.59	4	4.74	4	5.26	4
Multimedia programming and authoring	4.59	5	5.11	3	5.30	3
Digital image recording and processing	4.16	6	4.55	6	4.61	5
3D modeling and animating	3.77	7	4.50	7	4.04	6
Music composing, synthesising and effects	3.23	8	3.89	8	3.39	8

System Integration = SI
Creative Multimedia Cluster = CMC
Internet-based Business = IBB

For the Creative Multimedia Cluster group, the means of importance ratings concerning the multimedia–related competencies required of information professionals ranged from 5.58 to 3.89. This group of companies had rated creative skills and use of graphic software as the first in rank (5.58), followed by knowledge of content management and development (5.18), and multimedia programming and authoring (5.11). The rest of the competencies achieve mean scores of below 5.0. The lowest in rank was music composing, synthesising and effects, which had a mean of 3.89. The standard deviation for the competencies varied from 2.10 to 1.64. The mean score for the overall required multimedia-related competencies was 4.77.

For the Internet-based Business group of companies, the mean of importance ratings concerning the multimedia-related competencies required of information professionals ranged from 5.74 to 3.39. The ranking of competencies of the Internet-based Business group of companies were similar to the Creative Multimedia Cluster

group of companies in their rankings although the mean ratings were different. Creative skills and use of graphic software, which were ranked as the first in importance, had the mean of 5.74, knowledge of content management and development (5.61), multimedia programming and authoring (5.30), knowledge of copyright laws (5.26) and knowledge of scripting (5.09). The rest had mean scores of below 5.0. The standard deviation for the competencies varied from 2.21 to 1.39. The mean score for the overall required multimedia-related competencies was 4.88, and a standard deviation of 1.45.

4.5 Knowledge Management Competencies Ratings by Company Groupings

In Section C of the questionnaire, respondents were asked about the level of importance of knowledge management competencies required of information professionals working in their companies. The data is displayed in Tables 4.9 showing the mean of importance ratings of knowledge management competencies and the standard deviation for the three groups of companies – System Integration, Creative Multimedia Cluster, and Internet–based Business group of companies.

The mean ratings of knowledge management competencies for System Integration group of companies ranged from 5.92 to 5.56. Abilities to acquire, retrieve, analyse and disseminate knowledge using IT tools was found to be the top priority of requirement with the highest mean of 5.92. Respondents ranked ability to manage value-added information for strategic decision- making as the second top priority with a mean of 5.84. This was followed by: ability to give advice on the use of internal and external knowledge resources (5.72), and abilities to organise and codify information sources (5.66). However, ability to package specialised information products for company's use was given the last priority in requirements (5.56). The standard deviation for the

competencies varied from 1.31 to 0.96. The mean score for the overall required knowledge management competencies was 5.74 and a standard deviation of 1.05.

Table 4.9

Mean Scores on Knowledge Management Competencies Ratings by Company Groupings

Knowledge Management Competencies	SI (n = 64)		CMC (n = 38)		IBB (n = 23)	
	Mean	Rank	Mean	Rank	Mean	Rank
Abilities to acquire, retrieve, analyse and disseminate knowledge using IT tools	5.92	1	5.53	1	6.04	2
Ability to manage value-added information for strategic decision-making	5.84	2	5.53	1	6.09	1
Ability to give advice on the use of internal and external knowledge resources	5.72	3	5.42	4	5.91	5
Abilities to organise and codify information sources	5.66	4	5.26	5	6.00	3
Ability to package specialised information products for company's use	5.56	5	5.42	3	6.00	3

System Integration = SI
Creative Multimedia Cluster = CMC
Internet-based Business = IBB

The Creative Multimedia Cluster group of companies showed that the mean ratings ranged from 5.53 to 5.26. On knowledge management competencies, respondents put emphasis on both ability to manage value-added information for strategic decision-making; and abilities to acquire, retrieve, analyse and disseminate knowledge using IT tools. The mean for these two variables was 5.53. Ability to package specialised information products for company's use (5.42), and ability to give advice on the use of internal and external knowledge resources (5.42) were also found to have the same mean, while abilities to organise and codify information sources were found to be last in importance (5.26). The standard deviation for the knowledge management competencies varied from 1.76 to 1.22. The mean score for the overall required knowledge management competencies was 5.43 and a standard deviation of 1.21.

For the Internet-based Business group of companies, the mean was higher than the other two groups of companies, ranging from 6.09 to 5.91. Ability to manage value-added information for strategic decision-making was the most required competency by respondents with the highest mean of 6.09. The second most required competency was the abilities to acquire, retrieve, analyse and disseminate knowledge using IT tools (6.04). Following these competencies were: the abilities to organise and codify information sources (6.00) and the ability to package specialised information products for company's use (6.00) which had the same mean. Ability to give advice on the use of internal and external knowledge resources was found to be the last in the list (5.91). The standard deviation for the competencies varied from 1.53 to 1.31. The mean score for the overall required knowledge management competencies was 6.01 and a standard deviation of 1.26.

4.6 Other Supporting Skills Ratings by Company Groupings

Section D of the questionnaire asked respondents about other supporting competencies required of information professionals working in their companies. There were four sub-sections; management skills, interpersonal and communication skills, entrepreneurial skills, and research skills. Respondents were asked about the level of importance of these other supporting skills required of information professionals working in the MSC status companies. The data is displayed in Table 4.10 to 4.13 showing the mean of importance ratings of these supporting competencies for the three groups of companies – System Integration, Creative Multimedia Cluster, and Internet-based Business group of companies.

4.6.1 Required Management Skills

The mean ratings and standard deviation of management skills for System Integration group of companies ranged from 6.34 to 5.34. First in importance was "ability to solve problems," which had the highest mean of 6.34. This was followed by "has time management skills" (6.23), "has leadership skills" (5.97), ability to make fast decisions (5.95), "has organisational skills" (5.86), "has supervisory skills" (5.75), "has strategic skills" (5.70), and lastly, "has training skills" (5.34). The standard deviation for the skills varied from 1.07 to 0.76. The mean score for the overall required management skills was 5.89, and a standard deviation of 0.65.

Table 4.10
Mean Scores on Management Skills Ratings by Company Groupings

Management Skills	SI (n = 64)		CMC (n = 38)		IBB (n = 23)	
	Mean	Rank	Mean	Rank	Mean	Rank
Ability to solve problems	6.34	1	6.53	1	6.52	1
Has time management skills	6.23	2	6.16	3	6.26	3
Has leadership skills	5.97	3	5.92	6	5.78	6
Ability to make fast decisions	5.95	4	6.42	2	6.39	2
Has organisational skills	5.86	5	5.95	5	6.00	4
Has supervisory skills	5.75	6	5.82	7	5.61	7
Has strategic planning skills	5.70	7	6.03	4	5.83	5
Has training skills	5.34	8	5.37	8	5.30	8

System Integration = SI
Creative Multimedia Cluster = CMC
Internet-based Business = IBB

The mean and standard deviation of management skills for Creative Multimedia Cluster group of companies indicates that the means of importance ratings for management skills ranged from 6.53 to 5.37. First in importance was "ability to solve problems," (6.53). Respondents had also identified "ability to make fast decisions" as the second in importance with a mean of 6.42 followed by "has time management skills" (6.16), "has strategic planning skills" (6.03), "has organisational skills" (5.95), "has leadership skills" (5.92), and "has supervisory skills" (5.82). "Has training skills"

were found to have the lowest mean which was 5.37. The standard deviation for the management skills varied from 1.15 to 0.69. The mean score for the overall required management skills was 6.02, and a standard deviation of 0.70.

The mean of importance ratings for management skills for the Internet-based Business group of companies ranged from 6.52 to 5.30. Ranking first in importance was "ability to solve problems," (6.52). "Ability to make fast decisions" was second in importance with a mean of 6.39 and "Has time management skills" (6.26) ranked third in importance. These were followed by: "has organisational skills" (6.00), "has strategic planning skills" (5.83), "has leadership skills" (5.78), and "has supervisory skills" (5.61). "Has training skills" was found to have the lowest mean which was 5.30. The mean score for the overall required management skills was 5.96, and a standard deviation of 0.79. The standard deviation for the management skills varied from 1.40 to 0.59.

4.6.2 Required Interpersonal and Communication Skills

Data from Table 4.11 displays the mean of interpersonal and communication skills by groups of companies. For the System Integration group, the mean of importance ratings for interpersonal and communication skills ranged from 6.34 to 3.17. "Speaks English proficiently" was the most required skills for this group of companies, which had a mean of 6.34, followed by "writes English competently" (6.31), and "shows good presentation skills" and "ability to do technical writing" (5.70). Others following in rank order were: "has good influencing skills" (5.64), "has consultation skills" (5.61), and "has negotiation skills" (5.47). "Speaks Bahasa Malaysia proficiently" (4.88) and "writes Bahasa Malaysia competently" (4.78) did not seem to be highly rated, so was the "ability to do public relations work" (4.66). Lastly, as expected, "speaks one or

more foreign languages e.g., French, German, Arabic" had the lowest mean (3.17). The standard deviation for the skills varied from 1.67 to 0.76. The mean score for the overall required interpersonal and communication skills was 5.30, and a standard deviation of 0.83.

Table 4.11
Mean Scores on Interpersonal and Communication Skills Ratings by Company Groupings

Interpersonal and Communication Skills	SI (n = 64)		CMC (n = 38)		IBB (n = 23)	
	Mean	Rank	Mean	Rank	Mean	Rank
Speaks English proficiency	6.34	1	6.37	1	6.30	2
Writes English proficiently	6.31	2	6.18	2	6.35	1
Shows good presentation skills	5.70	3	5.92	3	5.61	3
Ability to do technical writing	5.70	4	5.00	8	4.83	8
Has good influencing skills	5.64	5	5.74	5	5.26	4
Has consultation skills	5.61	6	5.79	4	5.22	5
Has negotiation skills	5.47	7	5.66	6	5.22	5
Speaks Bahasa Malaysia proficiently	4.88	8	5.16	7	4.61	9
Writes Bahasa Malaysia competently	4.78	9	4.71	10	4.35	10
Ability to do public relations work	4.66	10	4.92	9	4.91	7
Speaks one or more foreign language e.g. French , German, Arabic	3.17	11	3.18	11	2.87	11

System Integration = SI
Creative Multimedia Cluster = CMC
Internet-based Business = IBB

The mean scores of interpersonal and communication skills for Creative Multimedia Cluster group of companies ranged from 6.37 to 3.18. "Speaks English proficiently" was the most required skill, which had a mean of 6.37. This was followed by "writes English competently" (6.18), and "shows good presentation skills" (5.92). Others in rank order were: "has consultation skills" (5.79), "has good influencing skills" (5.74), and "has negotiation skills" (5.66). "Speaks Bahasa Malaysia proficiently" had a mean of 5.16, and "ability to do technical writing" had a mean of (5.00). The rest had mean scores of below 5.0. The standard deviation for the skills varied from 1.74 to 0.87. The mean score for the overall required interpersonal and communication skills was 5.33, and a standard deviation of 0.79.

The mean of importance ratings by the Internet-based Business group of companies concerning the interpersonal and communication skills required of information professionals ranged from 6.35 to 2.87. "Writes English competently" had the highest mean (6.35). This was followed by: speaks English proficiently (6.30), shows good presentation skills (5.61), has good influencing skills (5.26), has negotiation skills (5.22), and has consultation skills (5.17). The last five were: ability to do public relations work (4.91), ability to do technical writing (4.83), speaks Bahasa Malaysia proficiently (4.61), writes Bahasa Malaysia competently (4.35), and lastly, speaks one or more foreign languages e.g. French, German, Arabic (2.87). The standard deviation for the skills varied from 1.86 to 0.98. The mean score for the overall required interpersonal and communication skills was 5.04, and a standard deviation of 1.14.

4.6.3 Required Entrepreneurial Skills

Data from Table 4.12 displays the mean of entrepreneurial skills for System Integration group of companies. The mean of importance ratings for entrepreneurial skills ranged from 5.70 to 5.13. The five highest mean scores obtained on rating the following skills; "has business analysis skills" (5.70), "ability to market and promote products and services" (5.69), "knowledge and understanding of global issues" (5.55), "ability to commercialise innovations" (5.41), and "knowledge of cyberpreneurship (e.g., e-commerce, e-government, e-finance)" (5.39). The standard deviation for the entrepreneurial skills varied from 1.33 to 1.02. The mean score for the overall required entrepreneurial skills was 5.43, and a standard deviation of 0.93.

Table 4.12

Mean Scores on Entrepreneurial Skills Ratings by Company Groupings

Entrepreneurial Skills	SI (n = 64)		CMC (n = 38)		IBB (n = 23)	
	Mean	Rank	Mean	Rank	Mean	Rank
Has business analysis skills	5.70	1	5.71	1	5.61	2
Abilities to market and promote products and services	5.69	2	5.66	2	5.39	5
Knowledge and understanding of global business issue	5.55	3	5.66	2	5.48	4
Ability to commercialise innovations	5.41	4	5.26	6	5.48	3
Knowledge of cyberpreneurship e.g. e-commerce, e-government, e-finance	5.39	5	5.11	7	5.65	1
Knowledge of business administration	5.16	6	5.32	4	5.26	6
Knowledge of financing and budgeting	5.13	7	5.29	5	5.00	7

System Integration = SI
Creative Multimedia Cluster = CMC
Internet-based Business = IBB

For the Creative Multimedia Cluster group of companies, the mean of importance ratings concerning entrepreneurial skills required of information professionals ranged from 5.71 to 5.11. The five skills with highest mean scores are "has business analysis skills" (5.71), "abilities to market and promote products and services" (5.56), "knowledge and understanding of global business issues" (5.66), "knowledge of business administration" (5.32), and "knowledge of financing and budgeting" (5.29). The standard deviation for the entrepreneurial skills varied from 1.69 to 1.01. The mean score for the overall required entrepreneurial skills was 5.43, and a standard deviation of 0.99.

The mean and standard deviation of entrepreneurial skills for Internet-based Business group of companies ranged from 5.65 to 5.00. While respondents from the Creative Multimedia Cluster group of companies ranked knowledge of cyberpreneurship (e.g., e-commerce, e-government, e-finance) as the last in importance, respondents from the Internet-based Business group of companies ranked it the first (5.65). "Has business analysis skills" was ranked as second in importance with a mean of 5.61. Ranked third in importance was "ability to commercialise innovations" (5.48).

The standard deviation for the entrepreneurial skills varied from 1.64 to 0.93. The mean score for the overall required entrepreneurial skills was 5.41, and a standard deviation of 1.20.

4.6.4 Required Research Skills

Table 4.13 displays the mean of research skills for the groups of companies. For the System Integration groups, the mean of importance ratings for research skills ranged from 5.58 to 5.05. Surprisingly, respondents felt that "ability to communicate research findings" as more important than the other abilities in research skills. "Ability to communicate research findings" had the highest mean (5.58). This is followed by "ability to do research for company" (5.53), "ability to interpret data" (5.47) and "knowledge of research methodology" (5.45). The standard deviation for the research skills varied from 1.25 to 1.04. The mean score for the overall required research skills was 5.42, and a standard deviation of 1.04.

Table 4.13
Mean Scores on Research Skills Ratings by Company Groupings

Interpersonal and Communication Skills	SI (n = 64)		CMC (n = 38)		IBB (n = 23)	
	Mean	Rank	Mean	Rank	Mean	Rank
Ability to communicate research findings	5.58	1	5.26	1	6.09	1
Ability to do research for the companies	5.53	2	5.08	3	5.52	3
Ability to interpret data	5.47	3	5.13	2	5.96	2
Knowledge of research methodology	5.45	4	5.03	4	5.17	4
Ability to do statistical analysis	5.05	5	4.74	5	5.09	5

System Integration = SI
Creative Multimedia Cluster = CMC
Internet-based Business = IBB

The mean of research skills for the Creative Multimedia Cluster group of companies indicates the mean of importance ratings ranging from 5.26 to 4.74. Ranking first in importance in requirement for research skills was "ability to

communicate research findings" (5.26). "Ability to interpret data" (5.13) was ranked as second in importance, and third was "ability to do research for company" (5.08). The standard deviation for the research skills varied from 1.55 to 1.28. The mean score for the overall required research skills was 5.05, and a standard deviation of 1.26.

The mean and standard deviation of research skills for the Internet-based Business group of companies ranged from 6.09 to 5.09. Like the other two groups of companies, "ability to communicate research findings" was ranked as the most important requirements with the highest mean of 6.09. "Ability to interpret data" (5.96) followed second and ability to do research (5.52) as the third. The standard deviation for the research skills varied from 1.44 to 0.88. The mean score for the overall required research skills was 5.57, and a standard deviation of 0.87.

4.7 Overall Major Skills and Competencies Ratings by Company Groupings

The last part of this section displays the overall results of the total mean score of the seven major skills and competencies, which were, the information technology-related competencies, multimedia-related competencies, knowledge management competencies, management skills, interpersonal and communication skills, entrepreneurial skills, and research skills. Table 4.14 illustrates the total mean of the seven major skills and competencies as mentioned above for the three groups of companies - the System Integration, the Creative Multimedia Cluster, and the Internet-based Business group of companies. The mean scores for the seven major skills and competencies were ranked in descending order.

Table 4.14 displays the mean scores of the major skills and competencies for the System Integration group of companies. The mean of importance ratings ranged from 5.89 to 4.38. The findings of this study revealed that among the seven major skills and

competencies, management skills (mean = 5.89) were found to be the first key competency required of information professionals working in the System Integration group of the MSC status companies. Respondents had also stressed the importance of knowledge management (mean = 5.74) and entrepreneurial skills (mean = 5.43). These were followed by research skills (mean = 5.42) and interpersonal and communication skills (mean = 5.30). Surprisingly, information technology-related competencies (mean = 5.20) was given second last in order of importance. Although multimedia-related competencies (mean = 4.38) was still required, it was placed as the last in the mean ranking. The standard deviation for the major skills and competencies varied from 1.40 to 0.65.

Table 4.14

Mean Scores on Required Major Skills and Competencies Ratings by Company Groupings

Categorical Variables	SI (n = 64)		CMC (n = 38)		IBB (n = 23)	
	Mean	Rank	Mean	Rank	Mean	Rank
Management Skills	5.89	1	6.02	1	5.96	2
Knowledge management competencies	5.74	2	5.43	2	6.01	1
Entrepreneurial skills	5.43	3	5.43	3	5.41	5
Research skills	5.42	4	5.05	5	5.57	4
Interpersonal and communication skills	5.30	5	5.33	4	5.04	6
Information technology competencies	5.20	6	4.99	6	5.67	3
Multimedia-related competencies	4.38	7	4.77	7	4.88	7

System Integration = SI
Creative Multimedia Cluster = CMC
Internet-based Business = IBB

The mean of the major skills and competencies for the Creative Multimedia Cluster group of companies ranged from 6.02 to 4.77. The mean ranking of the first to the third importance of key competencies was found to be similar with the System Integration group although the mean scores were slightly different. Similar to the System Integration group, respondents from the Creative Multimedia Cluster group of companies had rated information technology-related competencies (4.99) as the second

last in importance and multimedia -related competencies (4.77) as the last in rank order of importance. The standard deviations for the major skills and competencies varied from 1.37 to 0.70.

The mean of the major skills and competencies for the Internet-based Business group of companies ranged from 6.02 to 4.77. The ranking of skills and competencies of the Internet-based Business group of companies was very dissimilar from the System Integration group and Creative Multimedia Cluster group of companies. Respondents from the Internet-based Business group of companies had ranked knowledge management competencies (6.01) as the first key competency required of information professionals working for their companies. Management skills (5.96) ranked as second in importance and information technology-related competencies (5.57) ranked as the third in importance. These were followed by research skills (5.57), entrepreneurial skills (5.41), and interpersonal and communication skills (5.04). Like the System Integration group and the Creative Multimedia Cluster group of companies, the Internet-based Business group of companies also ranked multimedia-related competencies (4.88) as the last in importance. The standard deviations for the major skills and competencies varied from 1.45 to 0.79.

4.8 Required Personality Traits by Company Groupings

Section E of the questionnaire was designed to investigate the employers' requirement on the key personal qualities required of information professionals in order to achieve their job functions successfully in the MSC status companies.

In Section E of the questionnaire, respondents were asked the level of importance of the required personal qualities on a basis of a seven-point interval scale. Respondents were asked to circle the number that best described their opinion on the

importance, ranging from 1 for *not important at all* to 7 for *most important*. If the statement did not apply to their company, they were asked to circle NA (for not applicable). In this analysis, companies were grouped according to their categories - System Integration group, Creative Multimedia Cluster group, and Internet-based Business group. The data from the 29 variables were analysed for mean and standard deviation (*SD*). From the results of the analysis, the higher the mean value, the more important the stratum was for the competency. The competencies were arranged in rank order based on the mean important rating. Because of the large number of variables (29 altogether), factor analysis was performed for the 29 variables. Results from the factor analysis produced five factors or dimensions (the procedure of factor analysis was explained in the earlier part of this chapter).

Table 4.15 displays the mean of the 29 variables on personal qualities as required by the System Integration group of companies. The mean of importance ratings for personal qualities ranged from 6.59 to 5.47. With the highest mean of 6.59, "works well with others in a team" headed first in the list of required personal qualities of information professionals for the System Integration group of companies. "Responsible and reliable" ranked as second highest with a mean of 6.48 while "dedicated to work" as third highest with a mean of 6.39. The standard deviation for personal qualities varied from 1.23 to 0.62. The mean score for the overall required personal qualities was 6.11, and a standard deviation of 0.62.

Table 4.15

Mean Scores on Required Personal Qualities Ratings by Company Groupings

Personal Competencies	SI (n = 64)		CMC (n = 38)		IBB (n = 23)	
	Mean	Rank	Mean	Rank	Mean	Rank
Works well with others in a team	6.59	1	6.63	1	6.65	2
Responsible and reliable	6.48	2	6.34	8	6.74	1
Dedicated to work	6.39	3	6.34	8	6.48	9
Receptive to new ideas	6.38	4	6.37	6	6.65	2
Ability to accept pressure	6.38	4	6.39	5	6.48	9
Flexible and able to adapt changes	6.36	6	6.47	3	6.61	5
Self-motivated	6.30	7	6.26	13	6.65	2
Good communication skills	6.28	8	6.45	4	6.26	16
Ability to think critically	6.25	9	6.50	2	6.13	19
Committed to customer service	6.23	10	6.05	23	5.96	23
Life-long learner	6.20	11	6.11	22	6.26	18
Creates mutual respect and trust	6.19	12	6.29	11	6.48	9
Works independently	6.19	12	6.29	11	6.57	6
Open-minded	6.14	14	6.32	10	6.26	16
Shows high level of self-confidence	6.14	14	6.16	21	6.52	7
Creative and innovative	6.13	16	6.26	13	6.43	13
Ability to perform multi-task	6.09	17	6.37	6	6.43	13
Energetic, dynamic, outgoing	6.09	17	6.24	15	6.52	7
Optimistic	6.06	19	6.18	17	5.78	27
Emotionally stable	6.05	20	6.18	17	6.30	15
Sees the big picture	6.02	21	6.18	17	6.09	20
Self-starter	6.00	22	6.03	24	6.48	9
Seeks challenges	5.94	23	6.18	17	6.00	20
Seeks opportunities	5.91	24	6.21	16	5.96	23
Pleasant manner	5.86	25	6.03	24	6.09	20
Friendly	5.77	26	5.89	26	5.83	25
Visionary with long-range goals	5.77	26	5.74	29	5.83	25
Takes calculated risks	5.59	28	5.97	24	5.74	28
Has sense of humour	5.47	29	5.76	28	5.48	29

System Integration = SI
Creative Multimedia Cluster = CMC
Internet-based Business = IBB

For the Creative Multimedia Cluster group of companies, the mean of importance ratings for personal qualities ranged from 6.63 to 5.74. Similar to the System Integration group, heading the list of the 29 variables of required personal qualities for the Creative Multimedia Cluster was "works well with others in a team," which had a mean of 6.63. However, there were some differences with the other top ten qualities in the requirements of information professionals. The other top ten required personal

qualities in rank order were: ability to think critically (6.50), flexible and able to adapt to changes (6.47), good communication skills (6.45), ability to accept pressure (6.39), ability to perform multi-task (6.37), receptive to new ideas (6.37), responsible and reliable (6.34), dedicated to work (6.34), and open-minded (6.32). Although respondents thought that "visionary with long-range goal" (5.74) was important, the variable was given the last in the list of 29 required personal qualities. The standard deviation for personal qualities varied from 1.30 to 0.71. The overall mean score for the required personal qualities was 6.21, and a standard deviation of 0.67.

Compared to the System Integration and the Creative Multimedia Cluster group of companies, the Internet-based Business group of companies showed differences in the importance of personal qualities for information professionals. The highest mean was 6.74 that ranked "responsible and reliable" as the first of the 29 variables. Others which were categorised as the top ten in rank order were: self-motivated, works well with others in a team, and receptive to new ideas which all had the same mean of 6.65. These were followed by: flexible and able to adapt to changes (6.61), works independently (6.57), energetic, dynamic, outgoing (6.52), shows high level of confidence (6.52), creates mutual respect and trust (6.48), and dedicated to work. The standard deviation for personal qualities varied from 1.28 to 0.45. The mean score for the overall required personal qualities was 6.26, and a standard deviation of 0.58.

4.9 Inferential Statistical Analysis

The use of appropriate inferential statistical techniques often requires the normality assumption of the survey data to be tested. In order to determine the actual choice of statistical tests for the hypotheses, the data was examined whether they met the basic assumptions of normality. In this study, the data was plotted for normal distribution.

To examine the normality of the distributions, the Kolmogorov-Smirnov test was used. The results showed that some of the data produced high significance level indicating the distribution is normal, while some data showed low significance level suggesting lack of normality in distribution. Since the results suggested the use of parametric and non-parametric statistic, the decision had to be made on which to choose. After consulting the statistician and appropriate discussions between the researcher and the statistician, it was decided that parametric statistic was preferred. The independent-samples t test and the one-way analysis of variance (ANOVA) were chosen.

The parametric statistics were chosen because of several reasons: (a) they tend to be more powerful and are thus better able to detect differences if they really exist (Fife-Schaw, 2000a:364), and (b) they are robust to violations of the normality assumptions. Even if one of these assumptions is violated, the test is still valid (Salkind, 2000:255; Fife-Schaw, 2000a:367).

This section describes statistical techniques and significance testing used in the data analysis and the results and interpretation of the studied data. The methods of analyses for answering the research questions and testing of the hypotheses used were the one-way analysis of variance (ANOVA), followed by the Duncan's Multiple Range Test for post hoc analyses, while another was the independent-samples t test.

Following these are the analyses and the results using the statistical test on ANOVA, and independent-samples t test. The research questions and hypotheses are restated below, along with the findings through the various statistical tests.

4.10 Testing Hypotheses

This sub-section answers the following research questions and examines the hypothesis as stated below. The research question is explored and the hypothesis is tested using one-way analysis of variance (ANOVA).

Research Question # 3

Are there statistically significant differences among the different groups of the MSC status companies (System Integration, Creative Multimedia Cluster, and the Internet-based Business) regarding the competencies required of information professionals?

Hypothesis # 1

There are no statistically significant differences among the different groups of the MSC status companies (System Integration, Creative Multimedia Cluster, and the Internet-based Business) regarding the competencies required of information professionals.

A two-tailed test at 95 percent confidence level was used to detect the differences in means between the three groups of companies. If the two-tailed level of significance is equal or less than 0.05, the null hypothesis is rejected. The independent variables are the System Integration, Creative Multimedia Cluster, and the Internet-based Business group of companies. Seven areas of skills and competencies areas were examined. They were:

1. Information technology-related competencies.

2. Multimedia-related competencies.

3. Knowledge management competencies.

4. Other areas of skills, which were: management, interpersonal and communication, entrepreneurial, and research.

4.10.1 ANOVA Test on Required Information Technology-Related Competencies Ratings by Company Groupings

The comparison of mean scores using one-way analysis of variance at the level of significance of 0.05 was carried out for each competency under the section of information technology-related competencies among the three groups of the MSC status companies, namely, System Integration, Creative Multimedia Cluster, and Internet - based Business. The results indicated that overall statistically significant differences were observed on five of the thirteen competencies, namely, skills in using Internet technologies like the Internet/Intranet/Extranet ($F(2, 122) = 3.622$, $p < 0.030$), skills of using application software like word processing, desktop publishing, spreadsheet, graphics and presentation software ($F(2, 122) = 3.240$, $p < 0.043$), ability to use programming languages ($F(2, 122) = 3.135$, $p < 0.047$), skills in systems maintenance, operating, installing and testing of systems ($F(2, 122) = 3.949$, $p < 0.022$), and skills of using project management tools ($F(2, 122) = 6.733$, $p < 0.002$). Specifically, the data in Table 4.16 show that skills of using project management tools were rated   significantly higher than the other four skills.

In particular, the Internet-based business group of companies rated "skills in using Internet technologies like the Internet/Intranet/Extranet" significantly higher (Mean = 6.57) than the System Integration (Mean = 5.89) and the Creative Multimedia Cluster (Mean = 6.05) group of companies (see Table 4.16). The results were confirmed by the multiple comparisons of means using the Duncan's Multiple Range Test (see Table 4.16). This implied that both the System Integration and Creative Multimedia Cluster

group of companies have similar requirements for the skills but the Internet-based Business group of companies emphasised higher requirements on this skills.

The Internet-based Business group of companies rated "skills of using application software like word processing, desktop publishing, spreadsheet, graphics and presentation software" significantly higher (Mean = 6.43) than the Creative Multimedia Cluster (Mean = 6.03) and the System Integration (Mean = 5.77) group of companies (see Table 4.16). This suggested that both the System Integration and the Creative Multimedia Cluster group of companies might have similar requirements in the skills of using application software. The Internet-based Business group of companies emphasised higher requirements for skills related to using applications software.

Both the System Integration and the Internet-based Business group of companies rated "ability to use programming languages" significantly higher (Mean = 5.58, 5.43 respectively) than the Creative Multimedia Cluster (Mean = 4.71) group of companies, indicating similarities in programming skills requirements for both the System Integration and the Internet-based Business group of companies. However, the System Integration and the Internet-based Business group of companies have higher requirements in the programming skills compared to the Creative Multimedia Cluster group of companies.

The results confirmed that the System Integration and the Internet-based Business group of companies rated "skills in system maintenance, operating, installing and testing of systems" significantly higher (Mean = 5.20, 5.17 respectively) than the Creative Multimedia Cluster (Mean = 4.29) group of companies, implying that both the System Integration and the Internet-based Business group of companies placed similar but higher requirements on this skills compared to the Creative Multimedia Cluster group of companies.

Table 4.16
ANOVA Test on Required Information Technology-Related Competencies Ratings by
Company Groupings

Competencies	SI (Mean)	CMC (Mean)	IBB (Mean)	df	F	P value
Knowledge of basic computer technology	6.39	6.24	6.48	2 122	0.418	0.659
Skills in using Internet technologies	5.89[b]	6.05[b]	6.57[a]	2 122	3.622	0.030*
Skills of using application software	5.77[b]	6.03[b]	6.43[a]	2 122	3.240	0.043*
Ability to use programming languages	5.58[a]	4.71[b]	5.43[a]	2 122	3.135	0.047*
Ability to handle major operating systems	5.45	5.18	5.57	2 122	0.596	0.553
Knowledge of operating computer peripherals	5.36	5.42	6.13	2 122	2.983	0.054
Skills in systems maintenance	5.20[a]	4.29[b]	5.17[a]	2 122	3.949	0.022*
Abilities to design and develop DBMS	5.05	4.79	5.70	2 122	2.649	0.075
Skills of using project management tools	5.03[b]	4.68[b]	5.96[a]	2 122	6.733	0.002**
Ability to manage networked-based application	5.02	4.63	5.30	2 122	1.536	0.219
Abilities to design and maintain a web-site	4.53	4.84	5.48	2 122	2.960	0.056
Abilities to repair and troubleshoot computers	4.34	4.08	4.78	2 122	1.212	0.301
Skills of using AI tools	3.95	3.95	4.65	2 122	1.804	0.169

Note. Measurement was done on a 7-point interval scale in which 1 = not important at all to 7 = most important.
SI = System Integration group of companies.
CMC = Creative Multimedia Cluster group of companies.
IBB = Internet-based Business group of companies.
* The test is significant at p = 0.05 level. ** The test is highly significant at p = 0.01 level.
[a] and [b] are groups with significant mean differences using Duncan's Multiple Range Test at 0.05 level of significance.

The results also confirmed that the Internet-based Business group of companies rated "skills of using project management tools" significantly higher (Mean = 5.96) than the System Integration (Mean = 5.03) and the Creative Multimedia Cluster (4.68) groups of companies, indicating that both the System Integration and the Creative Multimedia Cluster groups of companies required similar skills but the Internet-based Business group of companies stressed higher requirements in having this skills. Table 4.16 displays the comparative analysis of the required information technology-related

competencies based on mean scores among the three MSC status groups of companies using the one-way analysis of variance.

4.10.2 ANOVA Test on Required Multimedia-Related Competencies Ratings by Company Groupings

The comparison of mean scores using one-way analysis of variance at the level of significance of 0.05 was carried out for each competency under the section of multimedia-related competencies among the three groups of the MSC status companies, namely, System Integration, Creative Multimedia, and Internet-based Business group. The results indicated that a statistically significant difference was observed on only one of the eight competencies. Specifically, the data in Table 4.17 showed that creative skills and use of graphics software were found to be significant ($F(2, 122) = 3.818, p < 0.025$).

Respondents from both the Internet-based Business and the Creative Multimedia group of companies rated "creative skills and use of graphics software" significantly higher (Mean = 5.74, 5.58 respectively) than the System Integration (Mean = 4.86) group of companies, implying that both the Internet-based Business and the Creative Multimedia Cluster group of companies have similar but higher requirements in having the skills than the System Integration group of companies.

Table 4.17
ANOVA Test on Required Multimedia-Related Competencies Ratings by Company
Groupings

Competencies	SI (Mean)	CMC (Mean)	IBB (Mean)	df	F	P value
Knowledge of content management and development	5.02	5.18	5.16	2 122	1.149	0.320
Creative skills and use of graphic software	4.86[b]	5.58[a]	5.74[a]	2 122	3.818	0.025*
Knowledge of scripting	4.83	4.58	5.09	2 122	0.554	0.576
Multimedia programming and authoring	4.59	5.11	5.30	2 122	1.684	0.190
Knowledge of copyright laws	4.59	4.74	5.26	2 122	1.179	0.311
Digital image recording and processing	4.16	4.55	4.61	2 122	0.791	0.456
3D modeling and animating	3.77	4.50	4.04	2 122	1.808	0.168
Music composing, synthesising and effects	3.23	3.89	3.39	2 122	1.301	0.276

Note. Measurement was done on a 7-point interval scale in which 1 = not important at all to 7 = most important.
SI = System Integration group of companies.
CMC = Creative Multimedia Cluster group of companies.
IBB = Internet-based Business group of companies.
*The test is significant at $p = 0.05$ level.
[a] and [b] are groups with significant mean differences using Duncan's Multiple Range Test at 0.05 level of significance.

4.10.3 ANOVA Test on Required Knowledge Management Competencies Ratings by Company Groupings

The comparison of mean scores for knowledge management competencies using one-way analysis of variance at the level of significant of 0.05 was carried out between the three groups of the MSC status companies, namely, System Integration, Creative Multimedia, and Internet-based Business group. The results indicated that there were no statistically significant differences on the required knowledge management competencies among the three groups of companies. This indicated that there was no difference in the requirements of the knowledge management competencies among the three groups of the MSC status companies.

4.10.4 ANOVA Test on Required Management Skills Ratings by Company Groupings

The comparison of mean scores using one-way analysis of variance at the level of significance of 0.05 was carried out for each competency under the section of management skills among the three groups of the MSC status companies, namely, System Integration, Creative Multimedia, and Internet-based Business group. The results indicated that statistically significant difference was observed on only one of the eight competencies. Specifically, the data in Table 4.18 shows that "ability to make fast decisions" was found to be highly significant ($F(2, 122) = 5.131, p < 0.007$).

Table 4.18

ANOVA Test on Required Management Skills Ratings by Company Groupings

Competencies	SI (Mean)	CMC (Mean)	IBB (Mean)	df	F	P value
Ability to solve problems	6.34	6.53	6.52	2 122	1.011	0.367
Has time management skills	6.23	6.16	6.26	2 122	0.123	0.884
Has leadership skills	5.97	5.92	5.78	2 122	0.342	0.711
Ability to make fast decisions	5.95[b]	6.42[a]	6.39[a]	2 122	5.131	0.007**
Has organisational skills	5.86	5.95	6.00	2 122	0.280	0.756
Has supervisory skills	5.75	5.82	5.61	2 122	0.307	0.736
Has strategic planning skills	5.70	6.03	5.83	2 122	1.209	0.302
Has training skills	5.34	5.37	5.30	2 122	0.022	0.978

Note. Measurement was done on a 7-point interval scale in which 1 = not important at all to 7 = most important.
SI = System Integration group of companies.
CMC = Creative Multimedia Cluster group of companies.
IBB = Internet-based Business group of companies.
**The test is highly significant at $p = 0.01$ level.
[a] and [b] are groups with significant mean differences using Duncan's Multiple Range Test at 0.05 level of significance.

Respondents from both the Creative Multimedia Cluster and the Internet-based Business group of companies rated "ability to make fast decisions" significantly higher

(Mean = 6.42, 6.39 respectively) than the System Integration (Mean = 5.95) group of companies indicating that both the Creative Multimedia Cluster and the Internet-based Business group of companies have similar requirements in this skill but higher compared to the System Integration group of companies.

4.10.5   ANOVA Test on Required Interpersonal and Communication Skills Ratings by Company Groupings

The comparison of mean scores using one-way analysis of variance at the level of significant of 0.05 was carried out for each competency under the section of interpersonal and communication skills among the three groups of the MSC status companies, namely, System Integration, Creative Multimedia, and Internet-based Business group.   The results indicated that statistically significant difference was observed on only one of the eleven competencies.   Specifically, the data in Table 4.19 shows that the "ability to do technical writing" was found to be highly significant ($F(2, 122) = 6.239, p < 0.003$).

In particular, respondents from the System Integration group of companies rated "ability to do technical writing" as significantly higher (Mean = 5.70) than the Creative Multimedia Cluster (Mean = 5.00) and Internet-based Business (Mean = 4.83) groups of companies, suggesting that both the Creative Multimedia Cluster and the Internet-based Business group of companies have similar requirements in having this ability but the System Integration placed higher requirements for this ability.

Table 4.19

ANOVA Test on Required Interpersonal and Communication Skills Ratings by
Company Groupings

Competencies	SI (Mean)	CMC (Mean)	IBB (Mean)	df	F	P value
Speaks English proficiently	6.34	6.37	6.30	2 122	0.040	0.961
Writes English competently	6.31	6.18	6.35	2 122	0.367	0.693
Shows good presentation skills	5.70	5.92	5.61	2 122	0.935	0.395
Ability to do technical writing	5.70[a]	5.00[b]	4.83[b]	2 122	0.6239	0.003**
Has good influencing skills	5.64	5.74	5.26	2 122	1.023	0.363
Has consultation skills	5.61	5.79	5.17	2 122	2.040	0.134
Has negotiation skills	5.47	5.66	5.22	2 122	0.716	0.491
Speaks Bahasa Malaysia proficiently	4.88	5.16	4.61	2 122	0.929	0.398
Writes Bahasa Malaysia competently	4.78	4.71	4.35	2 122	0.652	0.523
Ability to do public relations works	4.66	4.92	4.91	2 122	0.465	0.629
Speaks one or more foreign languages	3.17	3.18	2.87	2 122	0.315	0.731

Note. Measurement was done on a 7-point interval scale in which 1 = not important at all to 7 = most important.
SI = System Integration group of companies.
CMC = Creative Multimedia Cluster group of companies.
IBB = Internet-based Business group of companies.
**The test is highly significant at p = 0.01 level.
[a] and [b] are groups with significant mean differences using Duncan's Multiple Range Test at 0.05 level of significance

4.10.6 ANOVA Test on Required Entrepreneurial Skills Ratings by Company Groupings

Comparison of mean scores for entrepreneurial skills using one-way analysis of variance at the level of significant of 0.05 was carried out between the three groups of the MSC status companies which were, System Integration, Creative Multimedia, and Internet-based Business group. The results indicated that there were no statistically significant differences in the entrepreneurial skills among the three groups of

companies. This explained that there was no difference in the requirements of the entrepreneurial skills among the three groups of companies.

4.10.7 ANOVA Test on Required Research Skills Ratings by Company Groupings

The comparison of mean scores using one-way analysis of variance at the level of significance of 0.05 was carried out for each competency under the section of research skills among the three groups of the MSC status companies, namely, System Integration, Creative Multimedia Cluster, and Internet-based Business. The results indicated that statistically significant difference were observed on two of the five competency statements, which were, ability to communicate research findings ($F(2, 122) = 3.077$, $p < 0.05$), and ability to interpret data ($F(2, 122) = 4.104$, $p < 0.019$). Specifically, the data in Table 4.20 shows that "ability to interpret data" was rated as significantly higher ($F(2, 122) = 4.104$, $p < 0.019$).

Respondents from the Internet-based Business group of companies rated "ability to communicate research findings" significantly higher (Mean = 6.09) than the System Integration (Mean = 5.58) and the Creative Multimedia Cluster (Mean = 5.26) group of companies, implying that both the System Integration and the Creative Multimedia Cluster group of companies have similar requirements in this ability. However, the Internet-based Business group of companies emphasised higher requirements in the ability to communicate research findings.

The results also confirmed that the Internet-based Business group of companies rated "ability to interpret data" significantly higher (Mean = 5.96) than the System Integration (Mean = 5.47) and the Creative Multimedia Cluster (Mean = 5.13) groups of companies. This suggested that the Internet-based Business group of companies stressed higher requirements in this ability but both the System Integration and the

Creative Multimedia Cluster group of companies have similar requirements in this ability.

Table 4.20
ANOVA Test on Required Research Skills Ratings by Company Groupings

Competencies	SI (Mean)	CMC (Mean)	IBB (Mean)	df	F	P value
Ability to communicate research findings	5.58[b]	5.26[b]	6.09[a]	2 122	3.077	0.050*
Ability to do research for the company	5.53	5.08	5.52	2 122	1.751	0.178
Ability to interpret data	5.47[b]	5.13[b]	5.96[a]	2 122	4.104	0.019*
Knowledge of research methodology	5.45	5.03	5.17	2 122	1.290	0.279
Ability to do statistical analysis	5.05	4.74	5.09	2 122	0.837	0.435

Note. Measurement was done on a 7-point interval scale in which 1 = not important at all to 7 = most important.
SI = System Integration group of companies.
CMC = Creative Multimedia Cluster group of companies.
IBB = Internet-based Business group of companies.
*The test is significant at p = 0.05 level.
[a] and [b] are groups with significant mean differences using Duncan's Multiple Range Test at 0.05 level of significance

4.10.8 ANOVA Test on Required Major Skills and Competencies by Company Groupings

The final part of this sub-section looks at the overall comparison of total mean scores for the required major skills and competencies for the three groups of companies using one-way analysis of variances. Under Section A: Information Technology-Related Competencies of the questionnaire, the means for all the thirteen variables under the section, were totalled up to get the total mean score for all thirteen variables. The other six sections followed the same procedure. The major skills and competencies were information technology-related competencies, multimedia-related competencies, knowledge management competencies, management skills, interpersonal and communication skills, entrepreneurial skills, and research skills.

The comparison of mean scores using one-way analysis of variance at the level of significant of 0.05 was carried out for the major skills and competencies for all sections among the three groups of the MSC status companies, namely, System Integration, Creative Multimedia, and Internet-based Business group. The results indicated that statistically significant difference was observed on only one of the seven competencies. Precisely, the data in Table 4.21 shows that information-related technology was found to be significant ($F(2, 122) = 3.195$, $p < 0.044$).

The results further indicates that respondents from the Internet-based Business group of companies rated information technology-related competencies as significantly higher (Mean = 5.67) than the System Integration (Mean = 5.20) and the Creative Multimedia Cluster (Mean = 4.99) group of companies.

Table 4.21
ANOVA Test on Required Major Skills and Competencies Ratings by Company Groupings

Competencies	SI (Mean)	CMC (Mean)	IBB (Mean)	df	F	P value
Management skills	5.89	6.02	5.96	2 122	0.414	0.662
Knowledge management competencies	5.74	5.43	6.01	2 122	1.941	0.148
Entrepreneurial skills	5.43	5.43	5.41	2 122	0.004	0.996
Research skills	5.42	5.05	5.57	2 122	2.034	0.135
Interpersonal and communication skills	5.30	5.33	5.04	2 122	0.871	0.421
Information technology-related competencies	5.20^b	4.99^b	5.67^a	2 122	3.195	0.044*
Multimedia-related competencies	4.38	4.77	4.88	2 122	1.508	0.225

Note. Measurement was done on a 7-point interval scale in which 1 = not important at all to 7 = most important.
SI = System Integration group of companies.
CMC = Creative Multimedia Cluster group of companies.
IBB = Internet-based Business group of companies.
*The test is significant at $p = 0.05$ level.
[a] and [b] are groups with significant mean differences using Duncan's Multiple Range Test at 0.05 level of significance

Of the 57 competencies, only 10 (17.54%) competencies showed significant difference at $p = 0.05$ level. Out of the seven groups of competencies and skills being tested, only one, that was, the information technology-related competencies was significantly different overall, among the three groups of companies. It can be concluded that there was no statistically significant difference among the three groups of the MSC status companies regarding the competencies required of information professionals. Overall, the research supported hypothesis # 1 which stated, "There are no statistically significant differences among the different groups of the MSC status companies (System Integration, Creative Multimedia Cluster, and Internet-based Business) regarding the competencies required of information professionals." Thus, the null hypothesis was not rejected. This could be interpreted that the requirements of skills and competencies are almost similar among the three groups of the MSC status companies.

4.11 Testing Rating Differences Between Malaysian and Foreign Shareholder Groups of Companies

This sub-section presents the results of the comparison of mean scores between two groups of companies, which are the Malaysian shareholders and foreign shareholders groups of companies regarding the competencies required of information professionals. The research question is explored and hypothesis is tested using the independent-samples t test. The research question and hypothesis are stated below.

Research question # 4

Are there statistically significant differences between the Malaysian and foreign shareholders groups of the MSC status companies regarding the competencies required of information professionals?

Hypothesis # 2

There are no statistically significant differences between the Malaysian and foreign shareholders groups of the MSC status companies regarding the competencies required of information professionals.

A two-tailed test at 95 percent confidence level was used to detect the differences in means between these two groups. If the two-tailed level of significance is equal or less than 0.05, the null hypothesis is rejected. The independent variables are the Malaysian and foreign shareholders groups of the MSC status companies. Seven areas of skills and competencies were examined. They were:

1. Information technology-related competencies.

2. Multimedia-related competencies.

3. Knowledge management competencies.

4. Other areas of skills, which were: management, interpersonal and communication, entrepreneurial, and research.

4.11.1 Perception on Required Information Technology-Related Competencies

An independent-samples t test using the significant difference level of 0.05 was conducted for each of the 13 information technology-related competencies between the Malaysian and foreign shareholder companies. The results show that there was no significant difference between the two groups of companies in terms of their requirements for information technology-related competencies. The significance levels were far above the cut-off point of 0.05 or 5% significant level.

Overall, the results showed no significant differences between the Malaysian and foreign shareholder companies in all the 13 competencies related to information technology.

4.11.2 Perception on Required Multimedia-Related Competencies

An independent-samples t test using the significant difference level of 0.05 was conducted for each of the eight multimedia-related competencies between the Malaysian and foreign shareholder companies. The results indicate that there was no significant difference between the two groups of companies in terms of their requirements in the multimedia-related competencies.

Overall, the results show no significant differences between the Malaysian and foreign shareholder companies in all the eight multimedia-related competencies. This could meant that the two groups of companies equally accepted the competencies required.

4.11.3 Perception on Required Knowledge Management Competencies

An independent-samples t test using the significant difference level of 0.05 was conducted for each of the eight knowledge management competencies between the Malaysian and foreign shareholder companies. The results indicated that there was no significant difference between the two groups of companies in terms of their requirements in knowledge management competencies.

Overall, the results show no significant differences between the Malaysian and foreign shareholder companies in all the five competencies related to knowledge management. This explained that the two groups of companies equally accepted the competencies required.

4.11.4 Perception on Required Management Skills

An independent-samples t test using the significant difference level of 0.05 was conducted for each of the eight management skills statements between the Malaysian and foreign shareholder companies. The results indicate that there was no significant difference between the two groups of companies regarding their required skills in management. The significant levels were far above the cut–off point of 0.05 or 5% significant level.

4.11.5 Perception on Required Interpersonal and Communication Skills

An independent-samples t test using the significant difference level of 0.05 was conducted for each of the 11 interpersonal and communication skills between the Malaysian and foreign shareholder companies. The results summarised in Table 4.22 using the independent-samples t test revealed that two out of the 11 skills, which were, speaks Bahasa Malaysia proficiently, and writes Bahasa Malaysia competently, were statistically significant at $p = 0.05$. The mean score for "speaks Bahasa Malaysia proficiently" of Malaysian shareholder companies (Mean =5.17, $SD = 1.43$) was significantly higher ($t = 2.424$, $df = 119$, two-tailed $p = 0.017$) than that of the foreign shareholder companies (Mean = 4.47, $SD = 1.73$). The mean score for "writes Bahasa Malaysia competently" of Malaysian shareholder companies (Mean =5.04, $SD = 1.46$) was significantly higher ($t = 3.481$, $df = 119$, two-tailed $p = 0.001$) than that of the foreign shareholder companies (Mean = 4.04, $SD = 1.62$).

Table 4.22

T Test on Required Interpersonal and Communication Skills Between Malaysian and Foreign Shareholder Group of Companies

Interpersonal and Communication Skills	M'sian (Mean)	M'sian (Rank)	Foreign (Mean)	Foreign (Rank)	*t*-value	*P* value
Speaks English proficiently	6.30	1	6.47	1	-1.030	0.305
Writes English competently	6.20	2	6.47	1	-1.733	0.086
Shows good presentation skills	5.83	3	5.69	3	0.773	0.441
Has consultation skills	5.72	4	5.42	5	1.364	0.175
Has good influencing skills	5.72	4	5.74	4	1.043	0.299
Has negotiation skills	5.67	6	5.20	6	1.786	0.077
Ability to do technical writing	5.50	7	5.04	7	1.892	0.061
Speaks Bahasa Malaysia proficiently	5.17	8	4.47	9	2.424	0.017*
Writes Bahasa Malaysia competently	5.04	9	4.04	10	3.481	0.001**
Ability to do public relations work	4.87	10	4.69	8	0.624	0.534
Speaks one or more foreign languages	2.93	11	3.49	11	-1.787	0.076

Note. *The test is significant at $p = 0.05$ level.
**The test is highly significant at $p = 0.01$ level
Ranking is based on the mean, the higher the number the more preferred it is. For Malaysian shareholder companies $n = 76$, while for foreign shareholder companies $n = 45$.

4.11.6 Perception on Required Entrepreneurial Skills

An independent-samples *t* test using the significant difference level of 0.05 was conducted for each of the seven entrepreneurial skills between the Malaysian and foreign shareholder companies. The results indicated that there were no statistically significant differences between the two groups of companies with regards to the required entrepreneurial skills. The significant levels were far above the cut-off point of 0.05 or 5% significant level.

4.11.7 Perception on Required Research Skills

An independent-samples *t* test using the significant difference level of 0.05 was conducted for each of five research skills between the Malaysian and foreign shareholder companies. Results summarised in Table 4.23 using the independent-

samples *t* test revealed that two out of five skills, which were, knowledge of research methodology, and ability to do research for company, showed that the mean differences between the groups were statistically significant at $p = 0.05$.

The mean score for "ability to do research for company" of Malaysian shareholder companies (Mean =5.59, SD = 1.02) was significantly higher (t = 2.454, df = 119, two-tailed p = 0.016) than that of the foreign shareholder companies (Mean = 5.02, SD = 1.53). The mean score for "knowledge of research methodology" of Malaysian shareholder companies (Mean =5.50, SD = 1.21) was significantly higher (t = 2.364, df = 119, two-tailed p = 0.020) than that of the foreign shareholder companies (Mean = 4.91, SD = 1.50). This implied that the Malaysian shareholder companies have higher requirements on ability to do research for the company and having the knowledge of research methodology from the local graduates compared to the foreign shareholder companies. Overall, the results showed no significant differences between the Malaysian and foreign shareholder companies in the three skills but showed two skills that were statistically significant. It could still be interpreted that the two groups of companies equally accepted the skills required.

Table 4.23

T Test on Required Research Skills Between Malaysian and Foreign Shareholder Group of Companies

Competencies	M'sian (Mean)	M'sian (Rank)	Foreign (Mean)	Foreign (Rank)	*t*-value	*P* value
Ability to communicate research findings	5.72	1	5.36	1	1.519	0.131
Ability to do research for the company	5.59	2	5.02	3	2.454	0.016*
Ability to interpret data	5.58	3	5.27	2	1.472	0.144
Knowledge of research methodology	5.50	4	4.91	4	2.364	0.020*
Ability to do statistical analysis	5.08	5	4.80	5	1.148	0.253

Note. *The test is significant at $p = 0.05$. Ranking is based on the mean, the higher the number the more preferred it is. For Malaysian shareholder companies $n = 76$, while for foreign shareholder companies $n = 45$.

4.11.8 Perception on Required Major Skills and Competencies

The last part of this sub-section compares the mean differences according to the total mean score of the major skills and competencies. Under Section A: Information Technology-Related Competencies of the questionnaire, the mean scores for all the 13 variables under the section were totalled up to get the total mean score for the whole 13 variables. The other six sections followed the same procedure. The major skills and competencies were: information technology-related competencies, multimedia-related competencies, knowledge management competencies, management skills, interpersonal and communication skills, entrepreneurial skills, and research skills.

An independent-samples t test using the significant difference level of 0.05 was conducted for each of seven skills and competencies between the Malaysian and foreign shareholder companies. The results summarised in Table 4.24 using the independent-samples t test revealed that one out of seven major skills and competencies, which was, research skills, showed that mean differences between the groups was statistically significant at $p = 0.05$. The total mean score for research skills of Malaysian shareholder companies (Mean = 5.49, $SD = 0.93$) was significantly higher ($t = 2.061$, $df = 119$, two-tailed $p = 0.041$) than that of the foreign shareholder companies (Mean = 5.07, $SD = 1.32$).

However, the results showed that there were no significant differences between the foreign and Malaysian shareholder companies regarding the other six major skills and competencies. The total mean scores for the six categorical variables showed no statistically significant differences between the two groups of companies. Overall, the results showed no significant differences between the Malaysian and foreign shareholder companies on the six major skills and competencies although one showed

statistically significant. It could still be interpreted that the two groups of companies equally accepted the skills and competencies required.

Table 4.24
T Test on Required Major Skills and Competencies Between Malaysian and Foreign Shareholder Group of Companies

Major Skills and Competencies	M'sian (Mean)	M'sian (Rank)	Foreign (Mean)	Foreign (Rank)	*t*-value	*P* value
Management skills	5.99	1	5.93	1	0.451	0.653
Knowledge management competencies	5.73	2	5.65	2	0.390	0.697
Multimedia-related competencies	4.71	3	4.38	7	1.254	0.212
Entrepreneurial skills	5.52	4	5.30	3	1.169	0.245
Research skills	5.49	5	5.07	6	2.061	0.041*
Interpersonal and communication skills	5.36	6	5.13	4	1.375	0.172
Information technology-related competencies	5.30	7	5.11	5	0.950	0.344

Note: * The test is significant at $p = 0.05$. Ranking is based on the mean, the higher the number the more preferred it is. For Malaysian shareholder companies $n = 76$, while for foreign shareholder companies $n = 45$.

The results of the *t* test showed that, of the 57 competencies, only 4 (7%) competencies showed significant difference at $p = 0.05$ level. Out of the seven groups of competencies and skills being tested, only one, that was, the research skills was significantly different, among the Malaysian and foreign shareholders groups of companies. Overall, the research supported hypothesis # 2 which stated, "There are no statistically significant differences between the Malaysian and foreign shareholders groups of the MSC status companies regarding the competencies required of information professionals." It can be concluded that there was no statistically significant difference between the Malaysian and foreign shareholders groups of the MSC status companies regarding the competencies required of information professionals. Therefore, the null hypothesis was not rejected. This could be interpreted that the requirements of skills and competencies are almost similar among the Malaysian and foreign shareholders groups of the MSC status companies.

4.12 Relationships Between Required Personal Qualities and Competencies

The purpose of this sub-section is to find out whether there exists any relationship between personal qualities and competencies required of information professionals by the MSC status companies. Results of correlation between personal qualities and competencies required of information professionals in the MSC status companies are presented in this sub-section. To carry out the above procedure, the following are the main research question to be answered and hypotheses to be tested.

Research question # 5

Are there any relationships between the required personal qualities and competencies of information professionals working in the MSC status companies?

Hypotheses # 3-9

H3: A significant relationship exists between the required personal qualities and the information technology-related competencies for information professionals working in the MSC status companies.

H4: A significant relationship exists between the required personal qualities and the multimedia-related competencies for information professionals working in the MSC status companies.

H5: A significant relationship exists between the required personal qualities and the knowledge management competencies for information professionals working in the MSC status companies.

H6: A significant relationship exists between the required personal qualities and the management skills for information professionals working in the MSC status companies.

H7: A significant relationship exists between the required personal qualities and the interpersonal and communication skills for information professionals working in the MSC status companies.

H8: A significant relationship exists between the required personal qualities and the entrepreneurial skills for information professionals working in the MSC status companies.

H9: A significant relationship exists between the required personal qualities and the research skills for information professionals working in the MSC status companies.

In this testing of relationship, the researcher examined the strength of a connection between two categorical variables, which were related to each other. A numerical index called the coefficient of correlation expressed the degree or magnitude of the relation. The numerical index +1.00 is the highest possible value that the correlation coefficient assumes and it indicates a perfect relationship between variables (Burns, 2000b:233). Table 4.25 shows a guide to the degree of relationship indicated by the size of the coefficients.

Table 4.25
Remarks on the Degree of Correlation Coefficient

Absolute Value of Correlation Coefficient	Remarks on Correlation	Nature of Relationship
0.90 - 1.00	Very high correlation	Very strong relationship
0.70 - 0.90	High correlation	Marked relationship
0.40 - 0.70	Moderate correlation	Substantial relationship
0.20 - 0.40	Low correlation	Weak relationship
Less than 0.20	Slight correlation	Relationship so small as to be negligible

Source: Burns, 2000a:235

In this procedure, the 29 variables of personal qualities were reduced to five as a result of factor analysis. The five dimensions or characteristics of personal qualities were: dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment. These five variables were then correlated with seven areas of competencies, which were: information technology-related competencies, multimedia-related competencies, knowledge management competencies, management skills, interpersonal and communication skills, entrepreneurial skills, and research skills. These relationships were explored by the Spearman's rho correlation coefficient. The data supported the hypotheses at the 0.05 level of significance.

4.12.1 Personal Qualities and Information Technology-Related Competencies

In testing hypothesis # 3: A significant relationship exists between the required personal qualities and the information technology-related competencies of information professionals working in the MSC status companies, the results (as shown in Table 4.26) revealed that there are significant positive relationships between the five characteristics of personal qualities and the information technology-related competencies. The correlation coefficient between dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and

confidence and commitment; and the information technology-related competencies; on average fell within the range of rho = 0.18 to 0.32. Among the five characteristics of personal qualities, the most highly correlated was "dynamic and responsible" (rho = 0.32) and the "ability to interact with all levels of people" was the least (rho = 0.18). This indicated that the correlation fell within the range of slight to low correlation.

The results of the analysis using the bivariate test indicated that there was a highly statistically significant relationship between "dynamic and responsible" and the information technology-related competencies (rho = 0.32, p = 0.00). The results indicated a low correlation or there was a weak relationship between the two variables.

A relationship existed between "ability to interact with all levels of people" and the information technology-related competencies (rho = 0.182, p = 0.42). The results indicated a slight correlation in which relationship was so small as to be negligible.

"Sees the big picture" was also significantly correlated with the information technology-related competencies among the information professionals working in the MSC status companies (rho = 0.225, p = 0.011). The findings on the relationship indicated a low correlation or there was a weak relationship between "sees the big picture" and the information technology-related competencies.

A positive relationship occurred between "creative and innovative" and the information technology-related competencies for information professionals working in the MSC status companies (rho = 0.245, p = 0.006). The findings indicated that the correlation was low or there was weak relationship between "creative and innovative" and the information technology-related competencies.

The results also show that "confidence and commitment" was positively correlated with the information technology-related competencies among the information professionals working in the MSC status companies (rho = 0.204, p = 0.023). The

result indicated a low correlation or there was weak relationship between "confidence and commitment," and the information technology-related competencies.

Overall, the findings suggested positive and significant relationships between the required information technology-related competencies and the five characteristics of personal qualities, which were: dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment. It can be concluded that the MSC status companies' requirements in personal qualities is associated with the requirements in information technology-related competencies.

Table 4.26
Correlation Between Various Personal Qualities and Information Technology-Related Competencies

Pairs of Categorical Variables	Correlation coefficient (rho)	*P* value
Dynamic and responsible / IT-related competencies	0.320	0.000**
Ability to interact with all levels of people / IT-related competencies	0.182	0.042*
Sees the big picture / IT-related competencies	0.227	0.011*
Creative and innovative / IT-related competencies	0.245	0.006**
Confidence and commitment / IT-related competencies	0.204	0.023*

Note. All the correlations were positive. The number of valid cases were n = 125.
rho = Spearman rho correlation coefficient
p = actual probability value
*The test is significant at $p = 0.05$ level.
**The test is highly significant at $p = 0.01$ level.

4.12.2 Personal Qualities and Multimedia-Related Competencies

In testing hypothesis # 4: A significant relationship exists between the required personal qualities and the multimedia-related competencies for information professionals working in the MSC status companies, the results revealed that there are significant positive relationships between the five characteristics of personal qualities and the multimedia-related competencies. The correlation coefficient between dynamic

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and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment, and the multimedia-related competencies; on average fell within the range of rho = 0.138 to 0.274. Among the five characteristics of personal qualities, the most highly correlated was "creative and innovative" (rho = 0.274) and "confidence and commitment" (rho = 0.138) was the lowest. This indicated that the correlation fell within the range of slight to low correlation.

The evidence presented in Table 4.27 shows that a relationship existed between "dynamic and responsible" and the multimedia-related competencies (rho = 0.217, p = 0.015). The results indicated a low correlation or there was a weak relationship between the two categorical variables.

There is no evidence of significant relationship between the "ability to interact with staff at all levels of people" and the multimedia-related competencies (rho = 0.181, p = 0.44). The results indicated a slight correlation in which relationship can be considered as negligible.

"Sees the big picture" was positively correlated with the multimedia-related competencies among the information professionals working in the MSC status companies. (rho = 0.165, p = 0.066). The findings on the relationship indicated a slight correlation or relationship was so small as to be negligible between "sees the big picture" and the multimedia-related competencies.

A positive relationship occurred between "creative and innovative" and the multimedia-related competencies for information professionals working in the MSC status companies (rho = 0.274, p = 0.002). The findings indicated that correlation was low or there was weak relationship between "creative and innovative" and the multimedia-related competencies.

The results also reveal that there was a slight correlation between "confidence and commitment" and the multimedia-related competencies (rho = 0.138, p = 0.125). The results indicated that the relationship was so small as to be negligible between "confidence and commitment" and the multimedia-related competencies.

Overall, the findings suggested positive and significant relationships between the required multimedia-related competencies and the five characteristics of personal qualities, which were: dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment. It can be concluded that the MSC status companies' requirements in personal qualities is associated with the requirements in multimedia-related competencies. This implied that the requirements in personal qualities and the multimedia-related competencies are equally important.

Table 4.27

Correlation Between Various Personal Qualities and Multimedia-Related Competencies

Pairs of Categorical Variables	Correlation coefficient (rho)	P value
Dynamic and responsible/ Multimedia-related competencies	0.217	0.015*
Ability to interact with all levels of people/ Multimedia-related competencies	0.181	0.044*
Sees the big picture/ Multimedia-related competencies	0.165	0.066
Creative and innovative/ Multimedia-related competencies	0.274	0.002**
Confidence and commitment/ Multimedia-related competencies	0.138	0.125

Note. All the correlations were positive. The number of valid cases were n = 125.
    rho = Spearman rho correlation coefficient
    p = actual probability value
    *The test is significant at p = 0.05 level.
    **The test is highly significant at p = 0.01 level.

4.12.3 Personal Qualities and Knowledge Management Competencies

In testing hypothesis # 5: A significant relationship exists between the required personal qualities and the knowledge management competencies for information professionals working in the MSC status companies, the results revealed that there are highly significant positive relationships between the five characteristics of personal qualities and the knowledge management competencies. The correlation coefficient between dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment; and the knowledge management competencies; on average fell within the range of rho = 0.378 to 0.446. Among the five characteristics of personal qualities, the most highly correlated was "dynamic and responsible" (rho = 0.446) and "confidence and commitment" (rho = 0.378) was the lowest. This indicated that the relationship fell within the range of low correlation to moderate correlation.

Table 4.28 shows that a relationship existed between "dynamic and responsible" and the knowledge management competencies. Results of the analysis using the bivariate test indicated that there was a highly statistically significant relationship between "dynamic and responsible" and the knowledge management competencies (rho = 0.446, p = 0.000). The results indicated a moderate correlation or there was a substantial relationship between the two variables.

A relationship existed between "ability to interact with all levels of people" and the knowledge management competencies. The result using the Spearman's rho test that a highly statistically significant relationship existed between "ability to interact with all levels of people" and the knowledge management competencies (rho = 0.414, p = 0.000). The results indicated a moderate correlation or there was a substantial relationship between the two categorical variables.

"Sees the big picture" was significantly correlated with the knowledge management competencies among the information professionals working in the MSC status companies (rho = 0.441, p = 0.000). The findings on the relationship indicated a moderate correlation or there was a substantial relationship between "sees the big picture" and the knowledge management competencies.

A highly significant positive relationship occurred between "creative and innovative" and the knowledge management competencies for information professionals working in the MSC status companies. The findings indicated that correlation was moderate or there was a substantial relationship existed between "creative and innovative" and the knowledge management competencies.

The variable "confidence and commitment" were positively correlated with the knowledge management competencies among the information professionals working in the MSC status companies (rho = 0.378, p = 0.000). The results indicated a low correlation or there was a weak relationship between "confidence and commitment" and the knowledge management competencies.

Table 4.28

Correlation Between Various Personal Qualities and Knowledge Management Competencies

Pairs of Categorical Variables	Correlation coefficient (rho)	P value
Dynamic and responsible/ Knowledge management competencies	0.446	0.000**
Ability to interact with all levels of people/ knowledge management competencies	0.414	0.000**
Sees the big picture/ Knowledge management competencies	0.441	0.000**
Creative and innovative/ Knowledge management competencies	0.418	0.000**
Confidence and commitment/ Knowledge management competencies	0.378	0.000**

Note. All the correlations were positive. The number of valid cases were n = 125.
   rho = Spearman rho correlation coefficient
   p = actual probability value
   **The test is highly significant at p = 0.01 level.

Overall, the findings suggested positive and significant relationships between knowledge management competencies and the five characteristics of personal qualities, which were: dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment. The relationships were all highly significant. It can be concluded that the MSC status companies' requirements in personal qualities is associated with the requirements in knowledge management competencies. This implied that the requirements in personal qualities and the knowledge management competencies are equally important.

4.12.4 Personal Qualities and Management Skills

In testing hypothesis # 6: A significant relationship exists between the required personal qualities and the management skills for information professionals in the MSC status companies, the results revealed that highly significant positive relationships existed between the five characteristics of personal qualities and the management competencies. The correlation coefficient between dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment; and the management skills; on average fell within the range of $rho = 0.532$ to 0.632. Among the five characteristics of personal qualities, the most highly correlated was "sees the big picture" ($rho = 0.632$) while "dynamic and responsible" ($rho = 0.532$) was the lowest. This indicated that the relationships fell within the range of moderate correlation or substantial relationship.

Table 4.29 shows that a highly significant relationship existed between "dynamic and responsible" and the management skills for information professionals working in the MSC status companies ($rho = 0.532$, $p = 0.000$).

A highly significant relationship with a moderate correlation existed between the "ability to interact with all levels of people" and the management skills for information professionals working in the MSC status companies (rho = 0.582, p = 0.000).

There was a substantial relationship between "sees the big picture" and the management skills for information professionals working in the MSC status companies. The two variables were significantly correlated (rho = 0.632, p = 0.000).

A positive relationship with moderate correlation occurred between "creative and innovative" and the management skills for information professionals working in the MSC status companies. (rho = 0.540, p = 0.000).

"Confidence and commitment" were positively correlated with the management skills for information professionals working in the MSC status companies. There was a highly statistically significant relationship between "confidence and commitment" and the management skills (rho = 0.542, p = 0.000).

Table 4.29

Correlation Between Various Personal Qualities and Management Skills

Pairs of Categorical Variables	Correlation coefficient (rho)	*P* value
Dynamic and responsible/ Management skills	0.532	0.000**
Ability to interact with all levels of people/ Management skills	0.582	0.000**
Sees the big picture/ Management skills	0.632	0.000**
Creative and innovative/ Management skills	0.540	0.000**
Confidence and commitment/ Management skills	0.542	0.000**

Note. All the correlations were positive. The number of valid cases were n = 125.
    rho = Spearman rho correlation coefficient
    p = actual probability value
    **The test is highly significant at p = 0 .01 level.

Overall, the findings suggested positive and significant relationships between the management skills and the five characteristics of personal qualities, which were: dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment. The relationships

were all highly significant. It can be concluded that the MSC status companies' requirements in personal qualities is associated with the requirements in management skills. This implied that the requirements in personal qualities and the management skills are equally important.

4.12.5 Personal Qualities and Interpersonal and Communication Skills

This test was carried out to test hypothesis # 7. The results revealed that there were highly significant positive relationships between the five characteristics of personal qualities and the interpersonal and communication skills. The correlation coefficient between dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment; and the interpersonal and communication skills; on average fell within the range of rho = 0.387 to 0.540. Among the five characteristics of personal qualities, the most highly correlated was "confidence and commitment" (rho = 0.540) while "dynamic and responsible" (rho = 0.387) was the lowest. This indicated that the correlation fell within the range of low to moderate correlation.

Table 4.30 shows that a highly significant relationship existed between "dynamic and responsible' and the interpersonal and communication skills for information professionals working in the MSC status companies (rho = 0.387, p = 0.000). A relationship also existed between the "ability to interact with all levels of people" and the interpersonal and communication skills for information professionals working in the MSC status companies (rho = 0.443, p = 0.000). "Sees the big picture" was also significantly correlated with the interpersonal and communication skills for the information professionals working in the MSC status companies (rho = 0.637, p = 0.000). A moderate correlation with highly significant relationship occurred between

"creative and innovative" and the interpersonal and communication skills for information professional working in the MSC status companies (rho = 0.540, p = 0.000). The results reveal that "confidence and commitment" was positively correlated with the interpersonal and communication skills for information professionals working in the MSC status companies (rho = 0.542, p = 0.000).

Overall, the findings suggested positive and significant relationships between the required interpersonal and communication skills and the five characteristics of personal qualities, which were: dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment. The relationships were all highly significant. It can be concluded that the MSC status companies' requirements in personal qualities is associated with the requirements in interpersonal and communication skills which are both considered as equally important.

Table 4.30

Correlation Between Various Personal Qualities and Interpersonal and Communication Skills

Pairs of Variables	Correlation coefficient (rho)	P value
Dynamic and responsible/ Interpersonal and communication skills	0.387	0.000**
Ability to interact with all levels of people/ Interpersonal and communication skills	0.443	0.000**
Sees the big picture/ Interpersonal and communication skills	0.530	0.000**
Creative and innovative/ Interpersonal and communication skills	0.450	0.000**
Confident and commitment/ Interpersonal and communication skills	0.540	0.000**

Note. All the correlations were positive. The number of valid cases were $n = 125$.
 rho = Spearman rho correlation coefficient
 p = actual probability value
 **The test is highly significant at $p = 0.01$ level.

4.12.6 Personal Qualities and Entrepreneurial Skills

This section reveals the results in testing hypothesis #8. The results revealed that highly significant positive relationships existed between the five characteristics of

personal qualities and the entrepreneurial skills. The correlation coefficient between dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment; and the entrepreneurial skills; on average fell within the range of rho = 0.401 to 0.549 (Table 4.31). Among the five characteristics of personal qualities, the most highly correlated was "sees the big picture" (rho = 0.549) while "ability to interact with all levels of people" (rho = 0.401) was the lowest. This indicated that the correlations fell within the range of moderate correlation.

The evidence shows that a highly significant relationship existed between "dynamic and responsible" and the entrepreneurial skills for information professionals working in the MSC status companies (rho = 0.410, p = 0.000). A positive relationship existed between the "ability to interact with all levels of people" and the entrepreneurial skills for information professional working in the MSC status companies (rho = 0.403, p = 0.000). The relationship between "sees the big picture" was significantly correlated with the entrepreneurial skills for the information professionals working in the MSC status companies (rho = 0.549, p = 0.000). A positive relationship with moderate correlation occurred between "creative and innovative" and the entrepreneurial skills for information professional working in the MSC status companies (rho = 0.440, p = 0.000). The results also reveal that "confidence and commitment" was positively correlated with the entrepreneurial skills for information professionals working in the MSC status companies (rho = 0.441, p = 0.000).

Overall, the findings suggested positive and significant relationships between the required entrepreneurial skills and the five characteristics of personal qualities, which were: dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment. The relationships

were all highly significant. It can be concluded that the MSC status companies' requirements in personal qualities is associated with the requirements in entrepreneurial skills. This implied that the requirements in personal qualities and the entrepreneurial skills are equally important.

Table 4.31
Correlation Between Various Personal Qualities and Entrepreneurial Skills

Pairs of Categorical Variables	Correlation coefficient (rho)	P value
Dynamic and responsible/ Entrepreneurial skills	0.410	0.000*
Ability to interact with all levels of people/ Entrepreneurial skills	0.401	0.000*
Sees the big picture/ Entrepreneurial skills	0.549	0.000*
Creative and innovative/ Entrepreneurial skills	0.440	0.000*
Confidence and commitment/ Entrepreneurial skills	0.441	0.000*

Note. All the correlations were positive. The number of valid cases were $n = 125$.
rho = Spearman rho correlation coefficient
p = actual probability value
**The test is highly significant at $p = 0.01$ level.

4.12.7 Personal Qualities and Research Skills

This section covers the testing of hypothesis # 9. The results revealed that there were significant positive relationships between the five characteristics of personal qualities and the research skills (Table 4.32). A correlation coefficient between dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment; and the research skills; on average fell within the range of rho = 0.176 to 0.285. Among the five characteristics of personal qualities, the most highly correlated was "creative and innovative" (rho = 0.291), while "confidence and commitment" (rho = 0.176) was the lowest. The results indicated that the correlations fell within the range of slight to low correlation.

The evidence shows that a positive relationship with low correlation existed between "dynamic and responsible" and the research skills for information professionals working in the MSC status companies (rho = 0.245, p = 0.006). A positive relationship also existed between "ability to interact with all levels of people" and the research skills for information professionals working in the MSC status companies (rho = 0.198, p = 0.027). "Sees the big picture" was also significantly correlated with the research skills for the information professionals working in the MSC status companies (rho = .285, p = 0.001). A highly significant relationship occurred between "creative and innovative" and the research skills for information professional working in the MSC status companies (rho = 0.291, p = 0.001). The results also reveal that "confidence and commitment" was positively correlated with the research skills for the information professionals working in the MSC status companies (rho = 0.176, p = 0.049).

Table 4.32

Correlation Between Various Personal Qualities and Research Skills

Pairs of Categorical Variables	Correlation coefficient (rho)	P value
Dynamic and responsible/ Research skills	0.245	0.006**
Ability to interact with all levels of people/ Research skills	0.198	0.027*
Sees the big picture/ Research skills	0.285	0.001**
Creative and innovative/ Research skills	0.291	0.001**
Confidence and commitment/ Research skills	0.176	0.049*

Note. All the correlations were positive. The number of valid cases were n = 125.
rho = Spearman rho correlation coefficient
p = actual probability value
*The test is significant at p = 0.05 level.
**The test is highly significant at p = 0.01 level.

Overall, the findings suggested positive and significant relationships between the required research skills and the five characteristics of personal qualities, which were: dynamic and responsible, ability to interact with all levels of people, sees the big picture, creative and innovative, and confidence and commitment. It can be concluded

that the MSC status companies' requirements in personal qualities is associated with the requirements in research skills and are both considered equally important.

A conclusion could be made in which, the results supported the research hypotheses that significant relationships existed between the required personal qualities and the competencies in information technology, multimedia, knowledge management, management, interpersonal and communication, entrepreneurial, and research.

4.13 Conclusion

This chapter has presented the analyses of all the data collected in this research. Descriptive statistics and inferential statistics were presented in answering the five research questions and testing of nine hypotheses postulated for this study. The method of analyses included the mean ranking, one-way analysis of variance (ANOVA), and independent-samples t test while the test to determine relationships used the Spearman's rho correlation coefficient. The statistical tests were undertaken using the Statistical Package for the Social Sciences (SPSS) Version 10.0.

In summarising the findings of the first objective "To identify the employers' requirements on the key competencies and personal qualities required of information professionals in order to achieve work functions within the MSC status companies," it was revealed that knowledge management was the most required competency in the Internet-based Business group of companies while management skills was most required by the System Integration group and Creative Multimedia Cluster group of companies. As for the requirements on personal qualities, "works well with others in a team" was the most required by the System Integration group and Creative Multimedia group of companies while the Internet-based Business group preferred "responsible and reliable." A highly significant positive relationship was found to exist between the

major competencies and the personal qualities of information professionals. Further discussions on the findings of this study will be discussed in the following chapter.