CHAPTER FOUR: RESEARCH FINDINGS

4.0 INTRODUCTION

In the previous chapter, methodologies of how the survey was conducted have been discussed. In this chapter, the results of the survey, from analysis of the data collected will be presented. At the later part, this chapter will present some background information of the respondents first, and followed by some descriptive results of the variables involved. Finally, the results of the hypotheses testing will be discussed.

4.1 BACKGROUND OF RESPONDENTS

Table 4.1 presents the respondents' background. The overall profile of the participating respondents' demographic characteristics is presented in Table 4.1. Out of 78 respondents, 59 (75.6 %) were male and 19 (24.5%) were female managers. This result indicates involvement of female executives in implementation of web based supply chain management in their organizations. The age distribution of the participating managers ranged between 31 to 50 years and above. Majority of the respondents, about 33 (42.3%), were between age 31 to 35 years, followed by 19 (24.4%) between the age of 36 to 40 years. Meanwhile, 14 (17.9%) of the participated respondents were between the age of 41-45 years. A few number of respondents, 10 (10.3 %) and 4 (5.1 %) were aged between 46-50 years and above 50 years respectively. The later finding indicates that most of the executives in participating firms who actively involved in making decisions on supply chain/marketing using electronic or technology resources, are considered as young managers. Only a few of them were aged at late 40s and above 50.

From ethnicity perspective, majority of the participating executives are Malay 57 (73.1 %). The remaining are Chinese (21.6 %) and Indian (1.00 %). As for marital status, majority of the respondents 73 (93.6 %) were married, followed by 3 (3.8%) single, while 2 (2.6%) reported as divorced.

From the data gathered on respondents' academic qualification, 46 (59 %) respondents hold a master qualification, while 25 (31.2 %) of them hold a bachelor degree. The remaining 7 (9.1 %) respondents have diploma level education. These figures indicate that majority of the managers in this study, who take part in making web based supply chain management decisions are university graduates and have formal education in their field.

In term of working experience, 34 (43.6%) out of 78 respondents have been with their respective firm for 6 to 10 years, 26 (33.3%) for 1 to 5 years, and 12 (15.4%) for 11 to 15 years. On the other hand, 6 (7.7 %) respondents have served their firm for more than 15 years. From this information, it can be concluded that most of the respondents are well experienced in their management responsibility, and their view on any kind of operation applied are of highly important and reliable.

The firms studied were also divided and analyzed based on the type of their main operation. It was found that majority 57 (73.1%) of the participating firm were from manufacturing sector and 21 (26.9.1%) were from service sector. This is an indication that both manufacturing and service firms have adopted web based supply chain management system to enhance their competency.

Table 4.1: *Respondents' Background (n = 78)*

	Frequency	Percentage
Gender		
Male	59	75.6
Female	19	24.4
Marital status		
Married	73	93.6
Single	3	3.8
Divorced/Separated	2	2.6
Ethnic Origin		
Malay	57	73.1
Chinese	20	25.6
Indian	1	1.3
Time with the Company (in years)		
1-5 years	26	33.3
6-10 years	34	43.6
11-15 years	12	15.4
More than 15 years	6	7.7
Level of education		
Diploma	7	9.0
Bachelor	25	32.1
Master	46	59.0
Job Title		
Director Marketing	13	16.7
Head Manufacturing and Supply chain	17	21.8
Supply Chain Manager	18	23.1
Production Manager	26	33.3
Any other Title	4	5.1
Age		
31-35 years	33	42.3
36-40 years	19	24.4
41-45 years	14	17.9

46-49 years	8	10.3
50 years old and above	4	5.1
No of Employees		
1-5	2	2.6
10-50	54	69.2
51-100	7	9.0
101-200	5	6.4
More than 200 employees	10	12.8
Types of Firms		
Manufacturing	57	73.9
Services	21	26.1

4.2 RELIABILITY ANALYSIS

As discussed in chapter 3, the reliability of the instruments used were measured using Cronbach's alpha value method. According to Sekaran (2005), if the value of Cronbach's alpha is less than 0.6, it means that the instrument used has a low reliability (and thus opens for some errors). If the alpha value is within 0.7, the instrument has acceptable.

The internal consistency reliability coefficients (Cronbach's alpha) for the scales used in this study are all well above the level of 0.7, indicates that they can be accepted for the analysis purpose (Sekaran, 2005). In Table 4.2, alpha scores of all variables with completed response of 78 respondents are given.

Table 4.2 *Reliability Coefficients of the Constructs (n = 78)*

Constructs	No. of Items	Cronbach's Alpha
WBSCM Communication	7	.91
WBSCM Commitment from Top Mgt	8	.83
WBSCM Security of Data	5	.76
WBSCM Training and Education	5	.86
WBSCM Reliable Soft/Hardware	3	.84
Performance	3	.70

In present study reliability analyses were run on six main measures, which are WBSCM Communication, WBSCM Commitment from Top Management, WBSCM Security of Data, WBSCM Training and Education, WBSCM Reliable Soft/Hardware and firm performance. Table 4.2 highlights the reliability coefficients of the measures. As shown in the table, the measures give high value of Cronbach's alphas, confirming their reliability for further data analysis.

4.3 DESCRIPTIVE STATISTICS OF MAIN VARIABLES

Table 4.3 highlights descriptive statistics of the main variables of the present study, i.e. capabilities of web based supply chain management which are WBSCM Communication, WBSCM Commitment from Top Management, WBSCM Security of Data, WBSCM Training and Education, WBSCM Reliable Soft/Hardware and firm performance. From the table, communication as the capability of the web based supply

chain management and its important for successful web based supply chain management is perceived at moderate level (mean = 3.78, SD = 0.723). As for determination of commitment from top management as the capability of web based supply chain management, the also indicated relatively higher value (mean = 4.04, SD = 0.541).

In term of data security level, the respondents felt that the web based supply chain system would be more capable and effective with the availability of high level data security (mean = 3.82, SD = 0.662). The analysis of data gathered to study WBSCM Training and Education as a capability of the web bases supply chain management indicated moderate level of perceived importance (mean = 3.92, SD = 0.693).

For the responds on WBSCM Reliable Soft/Hardware as a capability for web based supply chain management in the firm, the respondents gave their opinion at a comparatively lower level (mean = 3.80, SD = 0.810). Finally, the data on a five- point scale for firm's performance indicates that most of the executives in this study of 78 firms have moderate level of performance (mean = 3.88, SD = 0.593).

Table 4.3: *Descriptive Statistics of Variables (n = 78)*

Items[1]	Mean	Standard Deviation (SD)
WBSCM Communication	3.74	.723
WBSCM Commitment from Top Mgt	4.04	.541
WBSCM Security of Data	3.82	.662
WBSCM Training and Education	3.92	.693
WBSCM Reliable Soft/Hardware	3.80	.810
Overall WBSCM Capabilities	3.86	.571
Performance[2]	3.88	.593

Note. [1]1 = Not at all, 2 = To a Small extent, 3 = somewhat, 4 = To a great extent, 5 = To a very great Extent
Note .2 = 1 = significant decrease, 2 = decrease, 3=same as before, 4=increase, 5=significant increase

In the following section, each variable will be examined in greater details as to what means in relation to the mean value found earlier.

4.3.1 WBSCM Communication

As previously shown, on average, the respondents rated the importance of the web communication as one of the capabilities of web based supply chain management at moderate level. Table 4.4 highlights the descriptive statistics for each item. Out of the seven items, accurate and timely communication in supply chains shows the highest

mean value of 3.82 (SD = 0.802), followed by easy communication between the customers and supply chain (mean = 3.81, SD = 0.927), transparency in WSCMS (mean 3.77, SD = 1.04), and stable availability in supply chain (mean = 3.77, SD = 0.836). In conclusion, the respondents gave their rating at moderate level (mean =3.74, SD = 0.723) for the communication as one of the capability for the effective web based supply chain management.

Table 4.4: Descriptive Results of the capability WBSCM communication (n=78)

Items[1]	Mean	SD
Accurate and timely communication in supply chains	3.82	.802
Easy communication between the customers and supply chains.	3.81	.927
Transparency in WSCMS	3.77	1.044
Stable availability of information in the supply chain	3.77	.836
Trusting relationship with partners in the supply chain	3.71	.870
Sharing information and insights	3.68	.845
High level of collaboration in the supply chain	3.65	.850
Total Mean (*WBSCM communication*)	**3.74**	**0.723**

Note. [1]1 = Not at all, 2 = To a Small extent, 3 = somewhat, 4 = To a great extent, 5 = To a very great Extent

4.3.2 WBSCM Commitment from Top Management

As stated earlier, eight items were used to measure firm's web based capability in terms of commitment from top management. Generally from the results, it was agreed that firms need a high level of commitment from top management for the affectivity of web based supply chain management. Table 4.5 highlights the descriptive statistics for each item. Out of the eight items, the Commitment of top management to the

implementation of a WSCMS shows the highest level of the capability in terms of top management commitment for effective WCMS (mean = 4.27, SD = 0.733), followed by the establishment of a complete performance measurement system in WSCMS by top management (mean = 4.26, SD = 0.711).

Involvement of top management in the WSCMS also perceived at high level (mean = 4.13, SD = 0.671) as well as commitment of top management to the WSCMS throughout the supply chain (mean = 4.13, SD = 0.756). Meanwhile persuasion of employees by top management to participate in the development of a WSCMS recorded mean value of 4.08 and SD of 0.660. However, the delegation of authority by top management in the implementation of the WSCMS in the firm rated show slightly lower value (mean = 3.60, SD = 1.02). The overall mean (4.04) and SD (0.541) of this measurement indicates that top management commitment towards implementation and persuasion for an effective web based supply chain management is very important to ensure the success of operation.

Table 4.5: *Descriptive results of* WBSCM Commitment from Top Mgt *(n =78)*

Items[1]	Mean	SD
Commitment of top management to the implementation of a WSCMS	4.27	.733
Establishment of a complete performance measurement system in WSCMS by top management	4.26	.711
Involvement of top management in the WSCMS	4.13	.671
Commitment of top management to the WSCMS throughout the supply chain	4.13	.762
Persuasion of employees by top management to participate in the development of a WSCMS.	4.08	.660
Knowledge and good understanding of top management of WSCMS	4.04	.813

Managing the transition to the new WSCMS by top management	3.83	.918
The delegation of authority by top management in the implementation of the WSCMS.	3.60	1.024
Total Mean (WBSCM Commitment from top managment)	**4.04**	**.541**

Note. [1]1 = Not at all, 2 = To a Small extent, 3 = somewhat, 4 = To a great extent, 5 = To a very great Extent

4.3.3 WBSCM Security of Data

Five items were used to measure the affectivity of data security as web based capability. On average, the respondents perceived that the firm's level of security of data is at mean value of 3.82 and SD of 0.662. This indicates that the level of security of the data is also treated at moderate extent in the firm. Table 4.6 shows the descriptive statistics for each item. Out of the five items, security of transactions across over the WSCMS shows the highest level of the capability for effective WCMS (mean = 4.17, SD = 0.844), followed by the establishment of a cost-effective security system in the WSCMS (mean = 3.94, SD = 0.888).

Similarly, the greater effectiveness of WSCMS in handling sensitive information, and availability of the use of information in the WSCMS across the supply chain are also perceived at moderate level respectively (mean = 3.83, SD = 0.828; mean = 3.83, SD = 0.918). Commitment of top management to the WSCMS throughout the supply chain gives higher value (mean = 4.13, SD = 0.756). However, availability of secure modes in the WSCMS for transmitting information was rated at lower value (mean = 3.35, SD = 1.091).

Table 4.6: Descriptive Results of WBSCM Security of Data (n = 78)

Items[1]	Mean	SD
Security of transactions across over the WSCMS	4.17	.844
A cost-effective security system in the WSCMS	3.94	.888
The greater effectiveness of WSCMS in handling sensitive information	3.83	.828
Availability of the use of information in the WSCMS across the supply chain	3.83	.918
Availability of secure modes in the WSCMS for transmitting information	3.35	1.091
Total Mean (WBSCM Security of Data)	3.82	.662

Note. [1]1 = Not at all, 2 = To a Small extent, 3 = somewhat, 4 = To a great extent, 5 = To a very great Extent

4.3.4 WBSCM Training and Education

In order to measure the extent of the training and education in the firm for the effective web based supply chain management, five items were used. From the data obtained, the firms' level WBSCM training and education was shown to be at moderately higher level (mean = 3.92, SD = 0.693). Table 4.7 highlights the descriptive statistics for each item. Out of the five items, the all personnel in the firm understand the benefits of the WSCMS recorded the highest mean value (mean = 4.08, SD = 0.818), followed by the personnel qualified to execute the WSCMS through training (mean = 4.01, SD = 0.875). Besides that, training on use of the WSCMS are also perceived at higher level (mean = 4.01, SD = 0.845). Developing own in-house training on WSCMS gives mean reading of 3.95 and SD of 0.866, while an overall training on WSCMS implementation shown to have the lowest mean value (mean = 3.58, SD = 0.693). Overall results of the statistical analysis indicates that firm's level of training and education needs are at moderately higher extent and considered as one of the key capabilities for WSCM.

Table 4.7: Descriptive *Results of* WBSCM Training and Education *(N = 78)*

Items[1]	Mean	SD
All personnel understand the benefits of the WSCMS	4.08	.818
Personnel qualified to execute the WSCMS through training	4.01	.875
Training on use of the WSCMS	4.01	.845
Developing own in-house training on WSCMS	3.95	.866
Training on WSCMS implementation	3.58	.890
Total Mean (**WBSCM Training and Education**)	3.92	.693

Note. [1]1 = Not at all, 2 = To a Small extent, 3 = somewhat, 4 = To a great extent, 5 = To a very great Extent

4.3.5 WBSCM Reliability of Software/Hardware

In order to perform analysis on the extent of reliability of the hardware and software used in the web based supply chain management, three items were used. On average, the respondents believed that this key capability is at moderate level (mean = 3.80, SD = 0.810). Table 4.8 highlights the descriptive statistics for each item. Out of the three items, firm's availability of reliable hardware and software in WSCMS is relatively at higher level, and recorded the highest mean value (mean = 3.82, SD = 0.802), followed by the performance of the Internet and response time of the server (mean = 3.81 SD = 0.927). Technical team supports for the software and hardware of WSCMS also recorded mean value at moderate level (mean = 3.77, SD = 1.04). In conclusion, this analysis suggested that the firms' need on reliable software and hardware for effective operations of the WSCM is at moderate extent.

Table 4.8: *Descriptive Results of* WBSCM Reliable Software/Hardware *(N = 78)*

Items[1]	Mean	SD
Reliable hardware and software in WSCMS	3.82	.802
The performance of the Internet and response time of the server.	3.81	.927
Technical team supports the software and hardware of WSCMS	3.77	1.044
Total Mean (**WBSCM Reliability of Software/Hardware**)	3.8	.810

Note. [1]1 = Not at all, 2 = To a Small extent, 3 = somewhat, 4 = To a great extent, 5 = To a very great Extent

4.3.5 Performance

As discussed earlier, performance is reflected in the way the firms relate their behavior to web base supply chain management capabilities. To measure firm's performance in subjective manner, three items were used and on average the firm's performance level was recorded as moderate (mean = 3.88, SD = 0.593). Table 4.9 highlights the descriptive statistics for each item. Out of the three items, the sales of the firm showed the highest mean value (mean = 4.17, SD= 0.808), followed by the profit margin on sales as compare to the competitors for the lat three years (mean = 3.79, SD = 0.945). While return on investment (ROI) recorded the lowest mean value (mean = 3.69, SD = 1.02). In general, this statistics indicates that the firms in this study have a better achievement in terms of sales as well profit margin on sales as compared to their competitors.

Table 4.9: Descriptive Results of Performance (n = 78)

Items[1]	Mean	SD
ROI	3.69	1.025
SALES	4.17	.808
PROFITMARGIN ON SALES	3.79	.945
Total Mean (Performance)	3.88	0.593

Note. [1]1 significant decrease, 2 = decrease, 3=same as before, 4=increase, 5=significant increase

4.4 CORRELATION MATRIX

This study examines the nature of the relationship that exists between independent and dependent variables. To determine the relationships among the variables, Pearson correlations were conducted. As a result, a correlation matrix was plotted and presented in Table 4.10 below.

As shown in Table 4.10, all independent variables show a positive and significant relationship to firm's performance. This mean that the all web based capabilities studied, which are WBSCM Communication, WBSCM Commitment from Top Management, WBSCM Security of Data, WBSCM Training and Education, WBSCM Reliable Soft/Hardware are correlated to firm performance. The data indicates that increasing these capabilities of WBSCM will results in higher firms' performance.

Table 4.10: *Correlations Matrix (n = 78)*

WBSC CAPABILITIES …	1	2	3	4	5	6
Communication (1)	1					
Commitment from Top Management (2)	.538 (**) *p =.000*	1				
Data Security (3)	.458 (**) *p =.000*	.795 (**) *p =.000*	1			
Training and Education (4)	.556 (**) *p =.000*	.661 (**) *p =.000*	.667 (**) *p =.000*	1		
Reliability of hardware and software (5)	.901 (**) *p =.000*	.551 (**) *p =.000*	.509 (**) *p =.000*	.577 (**) *p =.000*	1	
Performance (7)	.646 (**) *p =.000*	.766(**) *p =.000*	.725 (**) *p =.000*	.876(**) *p =.000*	.657 (**) *p =.000*	1

Correlation is significant at the 0.01 level (2-tailed).

4.6 HYPOTHESES TESTING

There are two main hypotheses formulated for the present study. To test the first hypotheses and its five sub-hypotheses, correlation test was conducted with Table 4.10 that displays the correlation matrix as reference. All five sub-hypotheses are supported. The results reveal a significant and positive relationship between performance and (a) WBSCM Communication (r = .646, p = 0.000), (b) WBSCM Commitment from Top Mgt (r = 0.766, p = 0.000), (c) WBSCM Security of Data (r = 0.725, p = .000), (d) WBSCM Training and Education (r = 0.876, p = 0.000) and (e) WBSCM Reliable Soft/Hardware (r = 0.657, p = 0.000).

4.7 MULTIPLE REGRESSION ANALYSIS

H2: Five factors of web based supply chain capabilities are positively influencing the firm' performance.

To test hypothesis 2, multiple regression was performed by employing the Enter method. The main purpose of this analysis is to estimate the variance explained in firm's performance by web based capabilities in terms of capabilities of web based supply chain management which are WBSCM Communication, WBSCM Commitment from Top Management, WBSCM Security of Data, WBSCM Training and Education, and WBSCM Reliable Soft/Hardware. These variables were included in the regression model using a default enters method to calculate the effects of variance caused on the performance (dependent variable). The results are shown in Table 4.11 below.

Table 4.11: *Overall Influences of WBSCM capabilities on Performance*

R	*R* square	Adjusted *R* square	Std. error of the estimates	*F*	Sig.
.926	.857	.847	.23178	86.45	.000

The results from Table 4.11 show that the multiple regression coefficients (*R*) of the five independent variables of web based supply chain capability in the performance model is 0.926 and the adjusted R square is 0.847. The value of F is 86.45 at ($p < .05$). This suggested that 84.7% of the variance in performance has been significantly explained by the five factors of WBSCM capabilities. Thus the results in this study support the hypothesis that firm's WBSCM capability has significant influence on performance. However, from the beta analysis regression, values of each independent

variable signify the contribution and some of the factor was found to be less significant. The results are shown in Table 4.12 below:

Table 4.12: *Influence of Each WBSCM Variables on Performance*

Variables	Std. error	Std. Beta	*t*	Sig.
WBSCM Communication	.086	.141	1.346	.183
Commitment from top Mgt	.089	.157	1.942	.056
Data Security	.068	.177	2.351	.021
Training & Education	.055	.573	8.979	.000
Reliability of H/software	.078	.023	.211	.834

From the result presented in Table 4.12, WBSCM training and education appeared to be the strongest explanatory variable for firm's performance ($\beta = .573$, $t = 8.97$, $p = 0.000$), followed by WBSCM data security ($\beta = 2.35$, $t = 0.021$, $p = .021$). However commitment from top management also have influence on the model with the least beta values ($\beta = .157$, $t = 1.942$, $p = 0.056$). On the other hand, WBSCM communication and reliability of hardware and software was found not to be able to predict the performance of manufacturing and service firms.

A further analysis was performed to examine on how these three variables; WBSCM Commitment from Top Management, WBSCM Security of Data, WBSCM Training and Education, individually and jointly contribute to the R Square value or the total explanatory power of the regression model. The result of stepwise regression analysis is shown in Table 4.13 for the overall effect of the three variables.

Table 4.13: The overall influence (effect) of WBSCM Commitment from Top Mgt, WBSCM Security of Data, WBSCM Training and Education on Performance.

R	R Square	Adjusted R Square	Std. Error of the Estimates	F	Sig.F
.917	.841	.834	.24134	130.35	.000

The results of this multiple regression analysis indicate that multiple regression coefficients (R) of WBSCM Commitment from Top Management, WBSCM Security of Data, WBSCM Training and Education on Performance is 0.917 and the adjusted R square is .834. The value of F is 130.35 at ($p < .05$). Due to that, the findings suggest that 83.4% of the variance (adjusted R square) in performance has been significantly explained by theses three factors of WBSCM capabilities. However WBSCM communication and reliability of hardware and software did not able to have significant influence on performance of these firms.

Table 4.14: Influence of each variable on performance

Variables	Adjusted R Square	Δ R Square	Beta	Sig.
Training & Education	.764		.632	.000
Commitment from top Mgt	.825	.062	.204	.016
Data Security	.834	.012	.181	.022

The result of stepwise multiple regression analysis suggest that WBSCM training and education is one of the capabilities with the highest standardized beta value (0.632)

and contributed 74.6% (adjusted R square = 0.764) to the variance of performance. The second most influential variable is the commitment from top management with beta value of 0.204 and contributed 6.2% to the overall variance of the performance. WBSCM data security as the key capability of supply chain management also has significant influence on the performance with the standardized beta value of 0.182 and contributed approximately 1.2% (R Square change = 0.012) to the variance of firm's performance. Therefore, the results of this hypothesis indicate that hypotheses two (2) failed to be rejected and therefore it is partly supported.

4.8 SUMMARY

This chapter has discussed the results and analyze the data obtained from this study. The findings of the study indicate that all hypotheses were supported. Specifically, by testing hypotheses 1 (a through e), it is shown that among the five web based supply chain management capabilities, though all are positively related to firm performance, but top management commitment, data security and training and education were highly significant and associated positively to firms' performance.

The result of multiple regression analysis, to test hypotheses 2, supports the notion that three of the WBSCM capabilities, top management commitment, data security and training and education are related to firms' performance. A summary of the hypotheses testing result is shown in Table 5.14.

Table 5.14: *Summary of Hypotheses Testing Results*

	Hypotheses	Result
H1a:	Communication as one of the capability of WBSCM will have direct positive association with firm performance.	Supported
H1b:	Commitment from top management as one of the capability of WBSCM will have direct positive association with firm performance	Supported
H1c:	Data Security as one of the capability of WBSCM will have direct positive association with firm performance	Supported
H1d:	Training and education as one of the capability of WBSCM will have direct positive association with firm performance	Supported
H1e:	Reliability of software and Hardware as one of the capability of WBSCN will have direct positive association with firm performance	Supported
H2:	Five factors of WBSCM capability are positively influencing the firm's performance.	Partially supported

In the following chapter, a discussion on what the results mean will be presented. In addition, recommendations for future research and practice, and the limitations of the present study will be offered.