7.1 Prologue

In this research the vertical coordination approach of supply chain has been used to assess the level and form of participation by the producers and intermediaries in the existing traditional supply chain and further the opinion has been taken on the potential to participate in vertically coordinated vegetable supply chain in vegetable industry considering the opinion of experts, producers and intermediaries. Simultaneously, this research is aimed at identifying the problems faced by producers and intermediaries in the supply of vegetables with the solution. For this purpose three specific objectives set are to evaluate the significance of monetary factors associated in supply chains for vegetables, to assess the need of vertical coordination and the involvement of farmers and intermediaries in supply chain of vegetables, and to determine the impact of vertical co-ordination on supply chain of vegetables industry.

The assessment of these objectives are presented and discussed in this chapter. For the better explanations eleven hypotheses related to the relationship of four constructs PSCV (Producer Supply Chain variables), ISCV (Intermediary Supply Chain variables) and VCEV (Vertical Coordination Effect variables) were formulated. All eleven hypotheses tested using different statistical techniques with SPSS software empirically has been incorporated in this chapter.

Firstly, research results are have been of high importance since understanding the need of vertical coordination in vegetable supply chain industry and the significance of monetary factors associated in supply chains for vegetables. Secondly, the outcome of this analysis is providing a strong support for the development of theory regarding vertical coordination approach in supply chain of vegetable industry. Thirdly, this research provides a strong roadmap of work in the area of vegetable supply chain with a vibrant methodological approach and providing the evidences for deciding the sustainability of vertical coordination approach in vegetable supply chain. Lastly, all limitations faced
during the research are also explained leading to the opportunity for further research. So, a roadmap is presented as the recommendations for further research.

7.2 Assessment of Objectives

For the purpose of this research three specific objectives set and analysis of data performed keeping the objectives at the utmost priority. All the three objectives achieved analyzing the data with different statistical techniques. The results of this thesis start with an overview of the country and the description of the supply chain of fresh vegetables. The study carried in a state of India named Odisha, having three major vegetable producing districts namely Bhubaneswar/ Khorda, Puri and Balasore taken in study. The four constructs PSCV (Producer Supply Chain variables), ISCV (Intermediary Supply Chain variables) and VCEV (Vertical Coordination Effect variables) formed eleven hypotheses also explained after empirically tested. In the following sections the summary of all the analysis with objectives and hypotheses testing has been presented as sections.

7.2.1 Characterization of the Expert

For the purpose of study 107 respondents taken from 3 different districts of Odisha all the three districts are having almost same frequency very closer to each other namely Bhubaneswar/ Khorda with 38 and 35.5, Puri with 37 and 34.6 and Balasore with 32 and 29.9 of frequency and percentage respectively. The age of the respondents are categorized in 4 categories where 18 years to 30 years age respondents are nil in the study, the highest respondents are from 31 years to 40 years age group of 46 in frequency and equivalent to 43%. other two age groups 41 years to 50 years and 51 years and more contributing the frequency of 39 and 22 and percentage 36.4% and 20.6% respectively. Gender gap is high among the respondents male and female respondents are 78 and 29 in frequency whereas 72.9 and 27.1 in percentage. The reason for this the male and female ration at the higher level in this sector is distinctive in the same manner. The executives have not taken in the study to get a strong perception about the sector though entry level managers are the highest in frequency as 46 equivalents to 43%. The second highest is the mid-level managers with frequency of 44 equivalent to 41.1%, the high level managers are comparatively less in number with frequency of 17 and as percentage 15.9% is due to the lesser number of high level managers as per the system. The highest contributor in the
study in experience is the experience group of 11 Years - 15 Years with 42 and 39.3 of frequency and percentage, the second highest is the experience group of 16 Years - 20 Years with 22 and 20.6 of frequency and percentage other 3 groups of experience are comparative less contributor like 26 Years - 30 Years with 9 and 8.4%, 30 Years and more with 2 and 1.9 and 6 Years - 10 Years with 1 and 0.9 respectively as frequency and percentage.

7.2.2 Characterization of the Producer

For the purpose of study 757 respondents taken from 3 different districts of Odisha all the three districts are having almost same frequency very closer to each other namely Bhubaneswar/ Khorda with 250 and 33%, Puri with 279 and 36.9% and Balasore with 228 and 30.1% of frequency and percentage respectively. Gender gap is high among the respondents male and female respondents are 605 and 152 in frequency whereas 79.9 and 20.1 in percentage, due to females less participation in work directly rather in household care and males are responsible for all the earning activity. The people engaged full time in vegetable farming of the respondents are categorized in 2 categories where 1 to 3 number of people group respondents are 474 equivalent to 62.6% in the study and the comparative lesser number of respondents from the other group of number 4 to 6 constituting 283 equivalent to 37.4%. The people engaged part time in vegetable farming of the respondents are categorized in 3 categories where the 1st and 3rd category showing the similarity as frequency of 384 and 311 with 50.7% and 41.1% respectively whereas the 2nd category is having much lesser number of respondents 62 as 8.2%. The people hired non family labor of the respondents are categorized in 2 categories where 1 to 5 number of people group respondents are 451 equivalent to 59.6% in the study and the comparative lesser number of respondents from the other group of number 6 to 10 constituting 306 equivalent to 40.4%. The people monthly earning of the family of the respondents are also categorized in 2 categories where Rs.1 - Rs.20 thousands number of people group respondents are 747 equivalent to 98.7% in the study and the comparative much lesser number of respondents from the other group of number Rs.21 thousands - Rs.40 thousands constituting 10 equivalent to 1.3% can be the reason people engaged in farming are much poor and earning is too less due to various reasons. For the purpose of study 757 respondents taken in the study with seven parameters where the duration of vegetable business startup of the respondents are in two categories one is between 3-6 years which is very less in number 142
as 18.8% though the other category more than 6 years is very high in number i.e. 615 as 81.2% meaning that people engaged in vegetable business are being in this for longer years. Role in vegetable supply chain parameter also has two categories farmer with small land holding as frequency of 619 as 81.8 though farmer with sufficient land holding as frequency of 138 as 8.2% shows that the farmers with small land holding are preferring to be in the vegetable cultivation compared to farmer with sufficient land holding. Next are the five parameters for the five vegetables cultivation participation with dichotomous opinion as yes or no. As the 1st is the vegetable in operation- potato has 658 respondents are in favor as 86.9% though 99 respondents are not in favor as 13.1%, the 2nd is the vegetable in operation- brinjal has 665 respondents are in favor as 87.8% though 92 respondents are not in favor as 12.2%, the 3rd is the vegetable in operation- cabbage 634 respondents are in favor as 83.8% though 123 respondents are not in favor as 16.2%, the 4th is the vegetable in operation- cauliflower has 628 respondents are in favor as 83.0% though 129 respondents are not in favor as 17.0% and the last 5th is the vegetable in operation- okra has 677 respondents are in favor as 89.4% though 80 respondents are not in favor as 10.6% shows that most of the farmers are participating in the cultivation of all the five vegetables.

Further twenty one parameters where the first is the no. of months in a year to grow potato of the respondents are in two categories one is between 1-3 months which is comparative high in number 475 as 62.7% though the other category between 3-6 months is less in number i.e. 282 as 37.3% meaning that people engaged in vegetable production are producing vegetables maximum six months in a year. The second is no. of months in a year to grow brinjal of the respondents are in two categories one is between 1-3 months which is very less in number 101 as 13.3% though the other category between 3-6 months is very high in number i.e. 656 as 86.7% meaning that people engaged in vegetable production are producing vegetables maximum six months in a year. The third is the no. of months in a year to grow cabbage of the respondents are in two categories one is between 1-3 months with number 451 as 59.6% though the other category between 3-6 months is less in number i.e. 306 as 40.4% meaning that people engaged in vegetable production are producing vegetables maximum six months in a year. The fourth is the no. of months in a year to grow cauliflower of the respondents are in two categories one is between 1-3 months with number 451 as 59.6% though the other category between 3-6 months is less in number i.e.
306 as 40.4% meaning that people engaged in vegetable production are producing vegetables maximum six months in a year. The fifth is the no. of months in a year to grow okra of the respondents are in three categories one is between 1-3 months with number 9 as 1.2% the other category between 3-6 months is 681 as 90.0% the last is the between 6-9 months is 67 as 8.9% meaning that people engaged in vegetable production are producing vegetables maximum nine months in a year where six months is highly recommended. The sixth is the no. of months in a year 5 years ago to grow potato of the respondents are in two categories one is between 1-3 months with number 207 as 27.3% though the other category between 3-6 months is 550 as 72.7% meaning that people engaged in vegetable production are producing vegetables maximum six months in a year. The seventh is the no. of months in a year 5 years ago to grow brinjal of the respondents are in three categories one is less than 1 month with number 35 and 4.6% another between 1-3 months with number 40 as 5.3% though the other category between 3-6 months is in number i.e. 682 as 90.1% meaning that people engaged in vegetable production are producing vegetables maximum six months in a year. The eighth is the no. of months in a year 5 years ago to grow cabbage of the respondents are in three categories one is less than 1 month with number 35 and 4.6% another between 1-3 months with number 512 as 67.6% though the other category between 3-6 months is in number i.e. 210 as 27.7% meaning that people engaged in vegetable production are producing vegetables maximum six months in a year. The ninth is the no. of months in a year 5 years ago to grow cauliflower of the respondents are in three categories one is less than 1 month with number 35 and 4.6% another between 1-3 months with number 522 as 69.0% though the other category between 3-6 months is in number i.e. 200 as 26.4% meaning that people engaged in vegetable production are producing vegetables maximum six months in a year. The tenth is the no. of months in a year 5 years ago to grow cabbage of the respondents are in three categories one is less than 1 month with number 35 and 4.6% another between 1-3 months with number 683 as 90.2% though the other category between 6-9 months is in number i.e. 54 as 7.1% meaning that people engaged in vegetable production are producing vegetables maximum nine months in a year. The eleventh is the no. of months in a year having irrigation facility to grow potato of the respondents are in two categories one is between 1-3 months with number 519 as 68.6% though the other category between 3-6 months is less in number i.e. 238 as 31.4% meaning that people engaged in vegetable production are getting irrigation facility for producing vegetables maximum six months in a
year. The twelfth is the no. of months in a year having irrigation facility to grow brinjal of
the respondents are in two categories one is between 1-3 months with number 72 as 9.5%
though the other category between 3-6 months is less in number i.e. 685 as 90.5%
meaning that people engaged in vegetable production are getting irrigation facility for producing
vegetables maximum six months in a year. The thirteenth is the no. of months in a year
having irrigation facility to grow cabbage of the respondents are in two categories one is
between 1-3 months with number 539 as 71.2% though the other category between 3-6
months is less in number i.e. 218 as 28.8% meaning that people engaged in vegetable
production are getting irrigation facility for producing vegetables maximum six months in a
year. The fourteenth is the no. of months in a year having irrigation facility to grow
cauliflower of the respondents are in two categories one is between 1-3 months with
number 480 as 63.4% though the other category between 3-6 months is less in number i.e.
277 as 36.6% meaning that people engaged in vegetable production are getting irrigation
facility for producing vegetables maximum six months in a year. The fifteenth is the no. of
months in a year having irrigation facility to grow okra of the respondents are in three
categories one is between 1-3 months with number 91 as 12.0% though the other category
between 3-6 months is less in number i.e. 215 as 28.4% and more than 9 months 451 and
59.6% meaning that people engaged in vegetable production are getting irrigation facility
for producing vegetables maximum six months in a year. The sixteenth is the no. of months
in a year 5 years ago having irrigation facility to grow potato of the respondents are in two
categories one is between 1-3 months with number 509 as 67.2% though the other category
between 3-6 months is less in number i.e. 248 as 32.8% meaning that people engaged in
vegetable production were getting irrigation facility for producing vegetables maximum six
months in a year. The seventeenth is the no. of months in a year 5 years ago having
irrigation facility to grow brinjal of the respondents are in two categories one is between 1-
3 months with number 29 as 3.8% though the other category between 3-6 months is less in
number i.e. 728 as 96.2% meaning that people engaged in vegetable production were
getting irrigation facility for producing vegetables maximum six months in a year. The
eighteenth is the no. of months in a year 5 years ago having irrigation facility to grow
cabbage of the respondents are in two categories one is between 1-3 months with number
333 as 44.0% though the other category between 3-6 months is less in number i.e. 424 as
56.0% meaning that people engaged in vegetable production were getting irrigation facility
for producing vegetables maximum six months in a year. The nineteenth is the no. of months in a year 5 years ago having irrigation facility to grow cauliflower of the respondents are in two categories one is between 1-3 months with number 480 as 63.4% though the other category between 3-6 months is less in number i.e. 277 as 36.6% meaning that people engaged in vegetable production were getting irrigation facility for producing vegetables maximum six months in a year. The twentieth is the no. of months in a year 5 years ago having irrigation facility to grow okra of the respondents are in two categories one is between 1-3 months with number 489 as 64.6% though the other category between 3-6 months is less in number i.e. 268 as 35.4% meaning that people engaged in vegetable production were getting irrigation facility for producing vegetables maximum six months in a year. The twenty first is the growing crops if not vegetables of the respondents are in two categories one is Rice with number 684 as 90.4% though the other category Wheat with 73 as 9.6% meaning that people engaged in vegetable production are producing vegetables maximum six months in a year.

7.2.3 Characterization of the Intermediary

For the purpose of study 757 respondents taken from 3 different districts of Odisha all the three districts are having almost same frequency very closer to each other namely Bhubaneswar/ Khorda with 256 and 33.8%, Puri with 246 and 32.5% and Balasore with 255 and 33.7% of frequency and percentage respectively. Gender gap is high among the respondents male and female respondents are 609 and 148 in frequency whereas 80.4 and 19.6 in percentage, due to females less participation in work directly rather in household care and males are responsible for all the earning activity. The people engaged full time in vegetable business of the respondents are categorized in 6 categories where 1 to 3 number of people group respondents are 199 equivalent to 26.3%, others are 4-6, 7-9, 10-12, 13 and more, no full time people with the following frequency and percentage respectively 201 (26.6%), 144 (19.0%), 120 (15.9%), 56 (7.4%), 37 (4.9%) in the study and the comparative equal in number of respondents. The people engaged part time in vegetable business of the respondents are categorized in 6 categories where 1 to 3 number of people group respondents are 32 equivalent to 4.2%, others are 4-6, 7-9, 10-12, 13 and more, no full time people with the following frequency and percentage respectively 71 (9.4%), 71 (9.4%), 143 (18.9%), 30 (4.0%), 410 (54.2%) in the study and the last category no full time people itself constituting the highest frequency i.e. more than 50%. The no. of enterprises in the market
has again 5 categories 51 – 100, 101 – 150, 151 – 200, 201 – 250 and with 251 - 300 the following frequency and percentage respectively 166 (21.9%), 234 (30.9%), 254 (33.6%), 45 (5.9%), 58 (7.7%) in the study and the and the comparative equal in number of respondents. The respondents yearly earning of the firm are also categorized in 6 categories where Rs.1 - Rs. 1 Lakh number of people group respondents are 307 equivalent to 40.6% others are Rs.1 Lakh - Rs.2 Lakh, Rs.2 Lakh - Rs.3 Lakh, Rs.3 Lakh - Rs.4 Lakh, Rs.4 Lakh - Rs.5 Lakh and Rs.6 Lakh and above with the following frequency and percentage respectively 204 (26.9%), 127 (16.8%), 66 (8.7%), 38 (5.0%), 15 (2.0%) in the study where the 1st category is the highest contributor can be the reason people engaged in vegetable business are not getting a very high profit in the business due to various reasons.

Further seven parameters where the duration of vegetable business startup of the respondents are in three categories one is between 3-6 years which is very less in number 69 as 9.1% though the other category more than 6 years i.e. 243 as 32.1% and the third is others in number 445 equivalent to 58.8% is the highest meaning that people engaged in vegetable business are being in this for longer years. Role in vegetable supply chain parameter also has three categories, the first is the purchase from traders, sell to traders (Wholesaler) as frequency of 331 as 47.7% though the second category is of purchase from traders, sell to consumers (Retailer) as frequency of 361 as 8.2% and the last is the purchase from farmers/traders, sell to traders/consumers (Commission Agent) as frequency of 65 as 8.6% shows that the second category is of purchase from traders, sell to consumers (Retailer) are preferring to be in the vegetable business compared to others. Next are the five parameters for the five vegetables in business participation with dichotomous opinion as yes or no. As the 1st is the vegetable in operation- potato has 622 respondents are in favor as 82.2% though 135 respondents are not in favor as 8.6%, the 2nd is the vegetable in operation- brinjal has 584 respondents are in favor as 77.1% though 173 respondents are not in favor as 22.9%, the 3rd is the vegetable in operation- cabbage 674 respondents are in favor as 89.0% though 83 respondents are not in favor as 11.0%, the 4th is the vegetable in operation- cauliflower has 672 respondents are in favor as 88.8% though 85 respondents are not in favor as 11.2% and the last 5th is the vegetable in operation- okra has 757 respondents are in favor as 100.0% though 00 respondents are not in favor as 00.0% shows that most of the farmers are participating in the cultivation of all the five vegetables.
Again the study carried with twenty parameters, where the opinion is dichotomous as yes or no. As the 1st is the value addition as picking and cleaning for potato has 685 respondents are in favor as 90.5% though 72 respondents are not in favor as 9.5%, the 2nd is the value addition as picking and cleaning for brinjal has 566 respondents are in favor as 74.8% though 191 respondents are not in favor as 25.2%, the 3rd is the value addition as picking and cleaning for cabbage has 566 respondents are in favor as 74.8% though 191 respondents are not in favor as 25.2%, the 4th is value addition as picking and cleaning for cauliflower has 566 respondents are in favor as 74.8% though 191 respondents are not in favor as 25.2% and the last 5th is the vegetable in operation- okra has 566 respondents are in favor as 74.8% though 191 respondents are not in favor as 25.2% shows that most of the intermediaries do the value addition to the produce by picking and cleaning all the five vegetables. The 6th is the value addition as sorting and grading for potato has 448 respondents are in favor as 59.2% though 309 respondents are not in favor as 40.8%, the 7th is the value addition as sorting and grading for brinjal has 211 respondents are in favor as 27.9% though 546 respondents are not in favor as 72.1%, the 8th is the value addition as sorting and grading for cabbage has 211 respondents are in favor as 27.9% though 546 respondents are not in favor as 72.1%, the 9th is the value addition as sorting and grading for cauliflower has 211 respondents are in favor as 27.9% though 546 respondents are not in favor as 72.1%, the 10th is the value addition as sorting and grading for okra has 211 respondents are in favor as 27.9% though 546 respondents are not in favor as 72.1% shows that most of the intermediaries do not go for the value addition to the produce by sorting and grading all the five vegetables. The 11th is the value addition as packaging and labeling for potato has 139 respondents are in favor as 18.4% though 618 respondents are not in favor as 81.6%, the 12th is value addition as packaging and labeling for brinjal has 00 respondents are in favor as 00.0% though 757 respondents are not in favor as 100.0%, the 13th is the value addition as packaging and labeling for cabbage has 00 respondents are in favor as 00.0% though 757 respondents are not in favor as 100.0%, the 14th is the value addition as packaging and labeling for cauliflower has 00 respondents are in favor as 00.0% though 757 respondents are not in favor as 100.0%, the 15th is the value addition as packaging and labeling for okra has 00 respondents are in favor as 00.0% though 757 respondents are not in favor as 100.0% shows that most of the intermediaries do not go for the value addition to the produce by packaging and labeling all the five vegetables, the 16th
is the value addition value addition as processing for potato has 757 respondents are in favor as 100.0% though none of the respondents are not in favor, the 17th is the value addition as processing for brinjal has 757 respondents are in favor as 100.0% though none of the respondents are not in favor, the 18th is the value addition as processing for cabbage 757 respondents are in favor as 100.0% though none of the respondents are not in favor, the 19th is value addition as value addition as processing for cauliflower has 757 respondents are in favor as 100.0% though none of the respondents are not in favor and the last 20th is the value addition as processing for okra has 757 respondents are in favor as 100.0% though none of the respondents are not in favor shows that most of the intermediaries do the value addition to the produce by picking and cleaning all the five vegetables.

7.2.4 Reach of Objectives

All three objectives are reached with the data analysis and well presented in earlier discussions. The first objective to evaluate the significance of monetary factors associated in supply chains for vegetables is discussed as the Producer Model Summary table providing the R (0.196) is representing the strength of the simple correlation, which is good. The R² (0.038) and Adjusted R² (0.037) indicates that dependent variable, "Vertical Coordination ", can be explained by the independent variable, "Prices & Transaction Cost" as 3%. The ANOVA table indicates that the regression model predicts the outcome variable is significantly well. Coefficients, provides us with information on predictor variable and showing that both the constant and Prices & Transaction Cost not contributing significantly to the model. Further, Intermediary Model Summary table providing the R (0.196) is representing the strength of the simple correlation, which is t good. The R² (0.038) and Adjusted R² (0.037) indicates that dependent variable, "Vertical Coordination ", can’t be explained by the independent variable, "Prices & Transaction Cost". The ANOVA table indicates that the regression model predicts the outcome variable is t significantly well. Coefficients, provides us with information on predictor variable and showing that both the constant and Prices & Transaction Cost is not contributing significantly to the model.

The second objective as to assess the need of vertical coordination and the involvement of farmers and intermediaries in supply chain of vegetables also presented in analysis as paired sample t- test on fourteen pairs formed with the two different sets of producers and intermediaries the fourteen pairs are perishibility reduction due to vertical
coordination - perishability reduction due to vertical coordination, wastage reduction due to vertical coordination - wastage reduction due to vertical coordination, yield increase due to vertical coordination - yield increase due to vertical coordination, demand security due to vertical coordination - demand security due to vertical coordination, non-seasonal availability assurance due to vertical coordination – non-seasonal availability assurance due to vertical coordination, control price fluctuation due to vertical coordination - control price fluctuation due to vertical coordination, variety of vegetable due to vertical coordination - variety of vegetable due to vertical coordination, quantity control due to vertical coordination - quantity control due to vertical coordination, risk reduction due to vertical coordination - risk reduction due to vertical coordination, system transparency due to vertical coordination - system transparency due to vertical coordination, grade and standard improvement due to vertical coordination - grade and standard improvement due to vertical coordination, support technology due to vertical coordination - support technology due to vertical coordination, support technology due to vertical coordination and vegetable growers benefit due to vertical coordination - vegetable growers benefit due to vertical coordination. The test carried here to know the gap in opinion of the two categories of respondents on the same parameter of the need of vertical coordination in vegetable supply chain for vegetables. All the fourteen pairs of variable are showing the p value less than or equal to 0.05 shows that there is statistically significant difference between the opinions of respondents and enforcing all these variables to vertical coordination of vegetable supply. Further for more clarification the paired sample t-test the eighteen pairs formed with the two different sets of producers and intermediaries the eighteen pairs are individual_growth_with_mutual_interest - individual_growth_with_mutual_interest, vscp_growth_with_mutual_interest - vscp_growth_with_mutual_interest, as_growth_with_mutual_interest - as_growth_with_mutual_interest, long_term_relationship_for_individual_growth - long_term_relationship_for_individual_growth, long_term_relationship_for_vscp_growth - long_term_relationship_for_vscp_growth, long_term_relationship_for_as_growth - long_term_relationship_for_as_growth, individual_growth_with_sharing_benefits - individual_growth_with_sharing_benefits, vscp_growth_with_sharing_benefits - vscp_growth_with_sharing_benefits, as_growth_with_sharing_benefits - as_growth_with_sharing_benefits, individualgrowth_with_mutual_interest - individualgrowth_with_mutual_interest, vscp_growth_mutual_interest - vscp_growth_mutual_interest, as_growth_mutual_interest - as_growth_
mutual_interest, individual_growth_with_open_information - individual_growth_with_open_information, vscp_growth_with_open_information - vscp_growth_with_open_information, as_growth_with_the_open_information - as_growth_with_the_open_information, individual_growth_with_interdependence - individual_growth_with_interdependence, vscp_growth_with_interdependence - vscp_growth_with_interdependence and as_growth_with_interdependence - as_growth_with_interdependence.

The test carried here to know the gap in opinion of the two categories of respondents on the same parameter of the effect of vertical coordination in vegetable supply chain for vegetables. All the eighteen pairs of variable are showing the p value less than or equal to 0.05 shows that there is statistically significant difference between the opinions of respondents and enforcing all these variables to vertical coordination of vegetable supply chain.

The third and the last objective as to determine the impact of vertical co-ordination on supply chain of vegetables industry presented with the analysis the Producer Model Summary providing the R (0.887) is representing the strength of the simple correlation, which is good. The $R^2$ (0.787) and Adjusted $R^2$ (0.787) indicates that dependent variable, “Effect_Vertical_Coordination”, can be explained by the independent variable, "Vertical Coordination” as 78%. The ANOVA table indicates that the regression model predicts the outcome variable is significantly well. Coefficients, provides us with information on predictor variable and showing that the Vertical Coordination contributing significantly to the model. Further the Intermediary Model Summary table providing the R (0.887) is representing the strength of the simple correlation, which is good. The $R^2$ (0.787) and Adjusted $R^2$ (0.787) indicates that dependent variable, "Effect Vertical Coordination", can be explained by the independent variable, "Vertical Coordination” as 78%. The ANOVA table indicates that the regression model predicts the outcome variable is significantly well. Coefficients, provides us with information on predictor variable and showing that both the constant and Vertical Coordination contributing significantly to the model.

All the three objectives assessed on the basis of data analyzed. It is observed that all the three objectives could get reached as it was defined in the beginning of the study, to find the solution for the specified research problem.
The major challenges cited by many authors are with system transparency, price fluctuation, wastage reduction, support to technology, perishability reduction, quantity control, grade and standards, variety, yield increase, non-seasonal availability, demand security and producers benefit are the variables can get controlled with the implementation of the concept of vertical coordination. After having much studies of literature available and the inputs provided by farmers, intermediaries and experts the research problem is focused on: How the vertical coordination approach can get used to solve the problem, where “farmers are unable to get requisite price realization commensurate to their efforts though consumers pay more price compared to the quality due to lack of cold storage facilities, poor market information system and unorganized faulty supply chain for vegetables” for the benefit and development of the vegetable industry. Based on the research problem the conceptual model prepared.
7.3 Major Findings of Hypotheses Tests

To validate the concept, altogether eleven hypotheses formulated and tested using the regression analysis technique of statistics are presented below.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Independent Variable</th>
<th>Dependent Variable</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1:</td>
<td>VC Variables</td>
<td>VC Effect Variables</td>
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<td></td>
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<td>Market &amp; Selling</td>
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<td>H3:</td>
<td>Constraints</td>
<td>VC Variables</td>
<td>Rejected</td>
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<td></td>
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<td>H4:</td>
<td>Credit &amp; Stock</td>
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<td>Cost</td>
<td>VC Variables</td>
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<td>H7:</td>
<td>Volumes and Flows</td>
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<td>Constraints</td>
<td>VC Variables</td>
<td>Rejected</td>
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<td>$\beta = 0.015, R^2 = 0.000$</td>
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<tr>
<td>H9:</td>
<td>Credit &amp; Stock</td>
<td>VC Variables</td>
<td>Accepted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\beta = 0.068^*, R^2 = 0.005$</td>
<td></td>
</tr>
<tr>
<td>H10:</td>
<td>Prices &amp; Transaction</td>
<td>VC Variables</td>
<td>Accepted</td>
</tr>
<tr>
<td></td>
<td>Cost</td>
<td>VC Variables</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\beta = 0.196^*, R^2 = 0.038$</td>
<td></td>
</tr>
<tr>
<td>H11:</td>
<td>VC Variables</td>
<td>VC Effect Variables</td>
<td>Accepted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\beta = 0.887^*, R^2 = 0.787$</td>
<td></td>
</tr>
</tbody>
</table>

The major outcome shows that except constraints all the factors are favouring for the implementation of vertically coordinated vegetable supply chain based on experts, intermediaries and producers opinion.
7.4 Conclusion

The research presented in this thesis is based on the concept of vertical coordination in supply chain specifically in vegetable industry. The study was carried keeping in mind the research objectives formulated based on research problem. This study finds that the acceptability and ability of the industry to get in the vertically coordinated industry to strengthen the supply chain as well the whole industry including producers and intermediaries for their benefit and the consumers as well. The study was quite challenging in the beginning reasoned the lack in availability of explored dimensions and specific instruments. The strong literature review with respect to agriculture sector, vegetable industry, supply chain management and the concept of vertical coordination became the pole star or compass for the research. Firstly, the study was centered in finding the research gap leading to research problem. The literature provided the base and evidence for the justification of the research problem. Secondly, research questions were prepared keeping in mind the formula 5 W and 1 H, i.e. what, why, who, when, where and how. Thirdly, objectives were set to find the solution to the problem, via the research questions. On the basis of the hypotheses tested results it is concluded that out of eleven hypotheses nine are accepted. That means according to expert’s opinion, producer’s opinion and intermediary’s opinion; vertical coordination, market and selling, credit and stock, prices and transaction cost, volumes and flows are the factors which will improve and give benefit to the producers and intermediaries.

7.5 Contributions of the Research

The vegetable industry faces many challenges, where producers are struggling and intermediaries are complaining. Hence, here the application of vertically coordinated approach has been the main contribution of this research. The role of producers and intermediaries in the traditional supply chain of vegetable industry has been studied and most of literature suggests for a new approach that can benefit producers and intermediaries. The first objective has evaluated the significance of monetary factors associated in supply chains for vegetables in vertically coordinated approach, further the second assessed the need of vertical coordination and the involvement of farmers and intermediaries in supply chain of vegetables, lastly the third worked for the determination of the level of impact of vertical co-ordination on supply chain of vegetables industry in
Odisha. The outcome of this research can have a very meaningful utilization by the producers and intermediaries involved in the business of vegetables. The current research study is also contributing to the academicians and researchers as the knowledge with the evidence for the further study about the vertical coordination concept. Application of vertically coordinated supply chain in vegetable industry having this type of research results may motivate government officers dealing with operational aspects of vegetable distribution to reduce and control cost. Most of the agri-economists may get the trigger based on the current study to forecast the future production and sales of vegetables. This research study may enhance the present knowledge about vegetable supply chain. The present study may give rise the directions for the formulation of new market distribution strategies of vegetables in an effective manner.

7.6 Limitations of the Research

The research carried out to find the solution for the challenges getting faced by the vegetable supply chain, could conclude a satisfactory result fulfilling all objectives specified. Then too, the first limitation faced during the study as some challenges were with the respondent’s ability of interaction due to lack in communication and information. Second limitation can get cited as vegetable producer’s expectations were something else as misunderstood the survey as the government project for the financial support lead to more time consuming discussions and become difficult to convey “no financial benefit is directly associated with this”. The intermediaries as well were not interested to disclose their information assuming this is a government project and will enforce them for some kind of financial pressure. The third is the time period and the sample taken for the study is just a representative, as Indian agriculture sector is mostly dependent on climatic conditions results may vary study to study.

7.7 Scope for Further Research

As clearly mentioned in the earlier section of the research limitation, the further research might be undertaken by taking different samples from other states of India. There is a need to change the month of the survey considering the seasons to validate the existing result. The change in geographical scope and time will make the researcher understand further the trend or the gap, which can be a great contribution to literature. More studies on
impact analysis of state government rural development schemes in relation to vertical coordination of vegetable supply chain might be undertaken. Finally, it is recommended to measure the need and efficiency of the vegetable supply chain with the effort of PPP (Public Private Partnership) approach for more applicability of vertical coordination approach to ensure the growth of vegetable industry.