Chapter 5
RESEARCH METHODOLOGY

5.1 Introduction

In order to achieve the objectives of the study, the primary data for this study were obtained from a field survey on a sample of export oriented SMEs in the agriculture based industries located throughout DIY Yogyakarta and in the surroundings of Java Indonesia. The questionnaire comprised of constructs of innovation in product distribution channels including the control variables. The owners or top managers of the SMEs were asked directly regarding the distribution channel innovation implementations. Data collection was administered using several methods; face-to-face technique, drop and collect, and sometimes snow bowling, to ensure an effective process of data collection.

5.2 Data collection and sample

Like previous studies of innovation that have been conducted by Wolf, and Pet (2006), Mandy (2010), Mukhamad *et al.,* (2011), and Rosli *et al.,* (2012), collecting data for the study was conducted by random sampling using quantitative survey with administered questionnaires in order to derive at an objective conclusion. The sample of the respondents were export oriented SMEs agriculture based industries located in DIY Indonesia (Daerah Istimewa Yogyakarta: Bantul, Yogyakarta, Sleman, and Kulon Progo) and its surroundings. The administered questionnaires were mostly delivered by survey and meeting face-to-face with the owners or top managers. However, sometimes, snow bowling, and drop and collect techniques were used in order to complete the survey effectively for meeting the owners or the top managers on the spot at the business location were found to be difficult.

The returned and analysed data of the respondents involved in this study consisted of 120 respondents from the top managers or owners of around 200 respondents distributed who had comprehensive knowledge on the previous and current organization practices, particularly related to distribution channel, innovation, and firm performance.

The characterization of SMEs in this study adopted the Law on Small Enterprises No. 9 of 1995 in Indonesia. It is defined that SME is a business unit with total initial assets less than 200 million Rupiah, excluding land and building, or with an annual value of sales of a maximum of 1 billion Rupiah, and a medium enterprise as a business unit with an annual value of sales of more than 1 billion Rupiah, but less than 50 billion Rupiah and the number of employees should be less than 100 employees. On the other hand, LEs are defined as units with more than 100 workers.

The primary data were obtained through convenience sampling, which allowed the sample to fulfil several criteria of the SMEs. A majority of the respondents (SMEs) was located in the dispersed area and this study included only companies with fewer than 100 employees and those which operated exclusively in the relevant processing industry. The data were collected using self-administered questionnaire. A subjective measurement method, which incorporated seven-point Likert scales (1-7) was used to measure each variable. Afterwards, a pilot study was conducted to more than 50 respondents, and then, preceded up to 120 respondents to ascertain its clarity and ease of completion to the survey sample. For that purpose, a group of SMEs located in DIY surroundings-Java Indonesia was identified and contacted. Upon their agreement to participate in the study, the questionnaires were delivered, in which drop and collect procedure was executed as

meeting the right respondents was rather difficult. Later, in order to obtain their feedback, the entrepreneurs were called over again after they had completed the questionnaires. The above methods of communication were deliberately chosen to assess the effectiveness of a non personal approach.

5.3 Quantitative survey

Like other previous studies by Love (2001), Mukhamad *et al.*,(2011), Mandy (2010), Eitan (2006), Mark (2004), Kim (2010), Rosli *et al.*, (2012), and Wolff, and Pet (2006), in this study, quantitative research was used to examine the impact of distribution channel innovation activities that led to firm performance. The process began with the formulation of a questionnaire. The questionnaire was then examined for content validity, reliability, and pre-tested to assess its clarity and ease of completion. Hence, in order to be more objective and effective, computer software was used to handle the large amount of data. The used method produced data which were directly related to the research constructs. Instead of having contended with any available data, a quantitative survey entitles the researcher to collect and analyse more genuine and accurate information. In this study, the survey complemented the personal interviews by lending statistical evidence to support or reject the preposition.

A period of six months from January until May 2011 was allocated for the questionnaires to be delivered and then returned. The data were afterwards entered into the computer, and hence forth, analysed using the Statistical Package for Social Science (SPSS) application. These three separate elements in the survey process-the production and administrations of the survey instrument, sampling procedure, and data analysis are examined at length.

5.4 Survey instrument

The survey instrument used in the study refers to a form consisting of structured questions and answers designed to gather data which is suitable for quantitative analysis. This research tool is also commonly known as a questionnaire (Zikmund, 2003).

A good questionnaire should be clear, reliable, and valid. Yet, in the present context where the targeted respondents are the owners or the top manager of SMEs in Indonesia, a questionnaire was perceived as simple and non-cumbersome. As such, discussion of this topic starts off with a review of the language and format of the questionnaire as a measure of its simplicity and user-friendliness (Zikmund, 2003).

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5.5 Language and format of the questionnaire

The Indonesian language was used in the questionnaire as the respondents were located in Indonesia and were predominantly the native population. The questionnaire was organized into five parts: entrepreneur profile, company profile, innovation in distribution channels, industry sector, environment, distribution performance, and firm performance. The entire document was compressed to around 10-page printout to give the impression of conciseness and answers were provided where the respondents were asked to mark the chosen alternative. Besides, the instructions for each part of the questionnaire, a one-paragraph message from the author was included for the respondents' cooperation.

5.6 Descriptive variables

The descriptive variables help to show the typical unit of analysis, while distinguish the differences among various categories of respondents. The answer options were designed to yield either nominal or ordinal data, which are often useful as descriptive statistics (Zikmund, 2003).

5.7 Independent, dependent, and mediating variables: construct, items, and scales

There are essentially several main independent variables: innovation in product distribution channel which consisted of 9 (nine) independent variables and control variables. They include competitive environment hostility, firm size, age of the company, and industry sector. This study used distribution performance in terms of effectiveness and efficiency as mediators between the relationship of distribution channel innovation and economic firm performance. The theoretical framework previously discussed why innovation in product distribution channel, competitive environment hostility, firm size, age of company, and industry sector were chosen as the independent and control variables and why distribution channel performance was used as the mediator. The formulation of the survey instrument used in the study was thus, based on the literature review. Before it can be administered on the sample, however, the instrument first needs to be subjected to a test of content validity. The ensuring section describes how this was completed.

5.8 Measures of the variables:

5.8.1 Innovation in product distribution channel

It has been found that research and development (R&D) empirically has significant relationship with innovation performance (Hurmelinna Laukkanen *et al.*, 2008). As one of

the recognized SMEs characteristics is that they have constraint in doing research and development (R&D) or they have no investment on R&D, therefore, to steer clear of R&D activities on SMEs, innovation in this study, was also measured as "new production process or modification method in addition to research and development activities" (Kongmanila[a] & Takahashi[b], 2009). According to Wittmann *et al.*, (2012), SMEs are usually hindered by barriers to do innovation rather than LEs. They also have fewer assets and R&D expenditures compared to LEs that make them innovate in a different way. Therefore, in this study, R&D were measured in terms of R&D activities (efforts) in each of the distributional activities for instance, observation activities of the 7 point of scale from the least emphasized up to the most emphasized.

The other measurement of innovation was concerned about the technology usage, both in terms of hardware and software such as machinery, computerized tools, or software programming on each part of typical activities of distribution channel. The activities of distribution channel were adopted from Bowesox *et al.*, (1986), and Ballou (1978). Walter (1977) grouped distribution channel into two main groups; assortment and logistic activities.

Innovation in assortment was measured by the use of technology application in terms of hardware (machinery) and software (programming) in assorting product (goods) in terms of market segment, product design, and quality. Other measure of innovation was measured by the use of new processing method of assortment and R&D activities. Innovation in order handling was measured by the use of technology application and new modification method in terms of hardware and software in order handling activities. Further order handling

innovation measurement was the use of new methods in order processing and research and development in order handling activities. Innovation in product and distribution scheduling was measured by the use of technology application in terms of software and hardware, particularly software programming that supports the product and the distribution scheduling activities. Another measurement of innovation was the application of R&D and new method in product and distribution scheduling activities. Innovation in information sharing and coordination was measured by the use of IT, such as the internet, mobile phone, automatic telecommunication machine in the customer service, and many others. Other measurement of innovation in information sharing system was R&D activities and other new methods. Innovation in inventory was measured by the application of technology in terms of computer software programming, hardware, the use of typical method, and R&D in the inventory activities, such as inventory forecasting, controlling, and coordination. Innovation in packaging was measured by the application of technology software and hardware, the use of new method, and R&D in the packaging activities. Innovation in transportation and coordination was measured via the use of technology in terms of hardware and software, the use of new method, and R&D activities. Innovation in warehousing and finished product handling was measured by software and hardware technology application, R&D, and the use of new method in warehousing and finished product handling. Lastly, innovation in acquisition was measured by the use of application in terms of hardware and software, R&D, and the use of different methods in the activities. In this study, the respondents were asked to indicate the level of their distribution channel innovation performance compared to their closest competitor in the same industry using a 7-point scale, ranging from “1 = least emphasized” to “7 = most emphasized”.

5.8.2 Measure of control variables

5.8.2.1 Competitive environment

Competitive environment of this study was referred to the uncertainty of a firm's external tasks environment that affected its business activities. According to Griffin (1987), the external task environment of a firm includes its competitors, customers, suppliers, regulators, and associations. The intensity of competition refers to the level of competition, for instance, price, product, technology, distribution, manpower, and raw materials. In studies alike this, Sandvik, and Sandvik (2003), Hurmelinna-Laukkanen *et al.,* (2008), and Yi-Ying Chang, and Hughes (2012) used environmental variables as control variables. The measurement of hostility environment in which often used as having significant effect on firm performance is in agreement with Miller, and Friesen's study (1982a, b, c). The executives or the owners were asked to evaluate their firm's competitive environment hostility over the five proceeding years, using the measures developed and validated by Miller, and Friesen (1982a, b, c). The hostility items were: "Rate of obsolescence in product technology," "Unfavourability of demographic changes," "Unfavourability of market changes," "Unfavourability of governmental regulations", and "Unfavourability of market conditions"- using a 7-point scale, ranging from "1 = the least hostile" to "7 = the most hostile".

5.8.2.2 Firm size

Common studies have mentioned that size of enterprise refers to the number of employment terms. McMahon (2001) found that enterprise size is significantly linked to better business performance. LEs were found to have higher level of success. Other studies showed that firm size did have an impact on firm performance, but the degree and direction

of its impact was diverse from one sample to another (Ozgulbas, Koyuncugil, & Yilmaz, 2006; Orser, Hogarth-Scott, & Riding, 2000; Moreno, & Casillas, 2007; Shanmugan, & Bhaduri, 2002; Yi-Ying Chang, & Hughes,2012).

According to the definition of the Ministry for Cooperative, Small and Medium Enterprises (2007), which was taken into account for this research, SMEs involve people activity from small to medium scale, with criteria as follows: they have maximum initial net assets of up to 10 billion rupiah, excluding land and buildings, owned by Indonesians, they comprised of independent companies, not owned by a large company and directly or indirectly affiliated with an LE, and they are private companies, with or without legal entity status. As most studies used a number of employees for firm size, this study used net asset, excluding lands and buildings in order to examine how the net asset controlled the dependent variables.

5.8.2.3 Age of company

SMEs characteristics refer to the originality of the enterprise, length of time in operation, size of enterprise, and capital sources which play important roles for the success of business. The length of time in operation might be related to learning curve. Old businessmen most probably have more experience learning than new comers. Kristiansen *et al.,* (2003) found that the length of time in operation was significantly associated with the success of business. In their new small firms study, Duchesneau, and Gartner (1990) found that leading entrepreneurs in successful firms opt to have been raised by entrepreneurial parents. They also were likely to have had a broader business and more prior start up experience. They also found that leading entrepreneurs in successful firms worked long

hours, had personal investment in the firm, and were good communicators. Moreover, successful firms were those initiated with ambitious goals, and leading entrepreneurs had a clear and broad business idea (Duchesneau, & Gartner 1990). Capturing the effect of the length of the company's operation in business or the length of service, both domestic and international markets, this study referred the age of company as length of time in operation in the business.

5.8.2.4 Industry sector

The industry sector is captured from the economic activities in producing goods. Industry sector has been associated with firms' motivation regarding adaptation to unpredictable resource conditions and performance fluctuations (Lubatkin *et al.,* 2006). In this measurement, industry types would be included in the sample of the research population. Significant influence of different types of industry on firm performance can be found in Gadenne (1999), Humphreys, and McClung (1981), and Yi-Ying Chang, and Hughes (2012), as among others due to the different marketing strategies and management practices (Gadenne, 1999).

5.8.3 Measure of distribution channel performance

According to the distribution channel literature, it is necessary to measure performance of the channel contributors to assess their channel contributions. Inadequate literature of this area has revealed the performance measurement and relevant criteria to measure the performance of channel contributors (Kumar *et al.,* 1992). Although the relational approach has been used for planned price decrease, reduced costs, improved quality, faster time to market, increased profitability and others, as performance measurement criteria (Ulaga *et*

al., 2003) the theoretical rationale for the measurement criteria is commonly absent (Kumar *et al.,* 1992). Quinn, and Rohrbaugh (1983) have revealed four models to measure performance which are: rational goal model, human relations model, internal process model, and open system model. With the modification for the above criteria, the present study selected measurements, such as quantity (i.e., production, stock turnover, and shipments), employee turnover, return on investment (ROI), and growth ratio with respect to the exporters, middlemen, and producers. Based on the strength of the relationship between trust and cooperation, channel performance may be varied. In this study, channel performance was measured in two constructs: effectiveness and efficiency performance. In terms of effectiveness, as adopted by Rhea, and Shrock (1987), this was measured by looking into the time of delivery and punctuality in delivery, whereas for efficiency, this study adopted a research carried out by Ulaga *et al.,* (2003) that measured the reduction cost of employees, tariff, and delivery or operational process-using a 7-point scale, by means of effectiveness ranging from "1 = the least effective" to "7 = the most effective, and efficiency ranging from "1 = the least efficient to "7 = the most efficient".

5.8.4 Dependent variable: firm performance economic indicator

Literatures define firm performance as the extent in which a firm can achieve success (Shankar, 2010). While Murphy *et al.,* (1996) found that growth and profit have become one of the most commonly considered extents of performance. According to Kemp *et al.,* (2003), in Kim (2009), the development of export performance is measured by looking at the sales per employee, value of export, total assets, and operation profit ratio. However, the study conducted by Kim (2009) measured export performance adopted from Kemp *et al.,* (2003), referred to the sales of manufactured products exported to other countries for

sale or in terms of average of export sales (average value of export)-(Mandy, 2009). Similarly, a study by Deeksha Singh (2009) also adopted export volume as export performance indicator. On the other hand, Kongmanila *et al.,* (2009), and Murphy *et al.,* (1996) extended export performance from export intensity, volume, and profitability.

In addition, Morgan *et al.,* (2004) conducted a meta-analysis, in which, they grouped export measures into economic and non economic measures. In this study, economic measure was used. Kongmanila *et al.,* (2009), and Morgan *et al.,* (2004) addressed that economic performance as the extent to which firms achieve their results relatively to their competitors in terms of sales, market share, profitability, and sales revenue from new products. While according to Murphy *et al.,* (1996), who examined 51 published entrepreneurship studies using performance as the dependent variable and found that the most commonly considered dimensions of performance were related to efficiency, growth, and profit. Therefore, referring to the previous studies, this study measured firm performance of the SMEs export oriented by looking at the export intensity, export volume, and profitability of the firms, which were adopted from Kongmanila *et al.,* (2009), and Murphy *et al.,* (1996), that described the measurement of the firm performance by export intensity, volume, and profitability using a 7-point scale, ranging from "1 = lowest" to "7 = the highest".

5.9 Pre-testing and administration of the actual survey

More than 50 respondents were collected for pilot study in order to examine the indications of significance, and then, it proceeded to 120 respondents. For that purpose, a group of SMEs located in DIY surroundings-Java Indonesia were identified and contacted. Upon their agreement to participate in the study, the questionnaires were delivered via drop and

collect procedure as meeting the right respondents had been somewhat difficult. In order to get their feedback, the entrepreneurs were called again after they had completed the questionnaires. The above methods of communication were chosen to assess the effectiveness of non personal approach.

5.10 Data analysis

For the purpose of analysing quantitative data, the SPSS-Windows version 17.0 was employed in the study. The process involved a series of tests, the results of which may either provide support for the earlier-phrased hypotheses or the basis to reject them, and hence, parametric tests were mostly used. However, prior to that, other types of analyses must first be performed to ensure that all assumptions regarding reliability, validity, and normality were not violated. Additionally, descriptive statistics were also produced to sketch the profile of the sample.

5.10.1 Reliability

The reliability of a survey instrument is generally defined as “the accuracy, stability, and relatively lack of error in a measuring instrument” (Burns, 2000, p. 337). A reliable instrument should also be dependable, predictable, and consistent. One of the most commonly used indicators of reliability is the Cronbach’s alpha. According to Pallant (2005), the Cronbach’s alpha measures the instrument’s internal consistency and an alpha coefficient of 0.7 is quoted (Nunnally, 1978; Davis, & Consenza, 1988; Pallant, 2005) as the minimum acceptable level. Table.1 is the reliability results for all the constructs:

Table 5.1 Reliability test of the constructs

Constructs	Items	Cronbach's Alpha
Innovation in assortment	5	0.908
Innovation in order handling	5	0.968
Innovation in product and distribution scheduling	5	0.979
Innovation in information sharing	5	0.971
Innovation in inventory	5	0.933
Innovation in packaging	5	0.927
Innovation in transportation coordination	5	0.948
Innovation in warehousing and product handling	5	0.883
Innovation in acquisition	7	0.921
Distribution effectiveness	2	0.850
Distribution efficiency	3	0.858
Competitive environment hostility	4	0.840
Firm performance (economic indicator)	3	0.841

Based on the sample survey (2011)

As seen in Table 5.1, the reliability of the constructs (Innovation in assortment, order handling, information sharing, distribution scheduling, inventory, packaging, transportation coordination, warehousing and material handling, acquisition, competitive environment hostility, distribution effectiveness, distribution efficiency, and firm performance economic indicator) fulfilled the standard range, which exceeded 0.7. Therefore, all construct were considered reliable (Nunnally, 1978; Davis, & Consenza, 1988; Pallant, 2005).

5.10.2 Validity

Once the reliability of the instrument had been established, tests of validity followed. As the subject of content validity had been dealt previously, the present section shall focus on the validity of the construct, which refers to the extent to which a particular scale does measure the concept it purports to (Zikmund, 2003). The assessment of construct validity, which consists of convergent and discriminant validity; a factor analysis is often considered appropriate (Davis, & Consenza, 1988). Ahmad (2004) demonstrated how the technique is

used to determine both convergent and discriminant validity by looking at the number of factors with high loadings.

5.10.2.1 Convergent validity

The data shown in Table 5.2 indicate that when factor analysis was conducted on all the variables, it resulted that they were extracted into one component, thus convergent validity was assured for these constructs. Furthermore, as the loading for each item in most of the analysis exceeded 0.5, all items for the constructs were retained for subsequent analyses. The form of construct validity-convergent was assessed here via factor analysis, the result of which is shown in Table 5.2. The data indicated that factor ability was assured for most of the constructs as the Kaiser-Meyer-Olkin (KMO) index exceeded 0.6 (Tabachnick, & Fidel, 1996) and the Bartlett's test of sphericity (P = < 0.05) for each of them.

Table 5.2 Convergent validity test of the constructs

Constructs	KMO Measure of Sampling Adequacy	Barlett's Test of Sphericity	No. of Factors Extracted
Innovation in assortment	0.769	0.000	1
Innovation in order handling	0.797	0.000	1
Innovation in product and distribution scheduling	0.827	0.000	1
Innovation in information sharing	0.862	0.000	1
Innovation in inventory	0.848	0.000	1
Innovation in packaging	0.775	0.000	1
Innovation in transportation and coordination	0.822	0.000	1
Innovation in warehousing and product handling	0.686	0.000	1
Innovation in acquisition	0.854	0.000	1
Distribution effectiveness	0.505	0.000	1
Distribution efficiency	0.706	0.000	1
Competitive environment hostility	0.720	0.000	1
Firm performance (economic)	0.712	0.000	1

Based on the sample survey (2011)

5.10.2.2 Discriminant validity

The objective of factor analysis above was not to determine the type of construct, but to identify if the variables could be grouped into fewer dimensions. As seen in Table 5.3, from the analysis of innovation in distribution channel variables, two factors were extracted. This indicated that the original 8 elements of the variables should be grouped into two major components, which were order handling innovation separated into different groups, while the others were still grouped in the same group.

Table 5.3 Discriminant validity test

Independent variables	Component matrix	
	1	2
Innovation in order handling	0.560	**0.662**
Innovation in product and distribution scheduling	**0.733**	0.048
Innovation in information sharing system	**0.741**	0.282
Innovation in inventory	**0.689**	-0.454
Innovation in packaging	**0.669**	-0.473
Innovation in transportation coordination	**0.680**	0.037
Innovation in warehousing in material handling	**0.642**	-0.189
Innovation in acquisition	**0.608**	0.184

Based on the sample survey-Extraction Method: Principal Component Analysis (2011)

As depicted in Table 5.3, the test was intended primarily to produce support for the earlier decision to analyse innovation in distribution channel as individual variables; Innovation in inventory, information sharing, packaging, order handling, distribution and product scheduling, warehousing and finished good handling, transportation and coordination, and acquisition. As shown in Table 5.4, the result showed that innovation in logistic consisted of two components, in which, order handling was loaded into a separate group.

Table 5.4 Summary Discriminant Validity Test Result

No.	Construct	KMO Measure of Sampling Adequacy	Barlett's Test of Sphericity	No. of Factors Extracted
1.	Innovation in inventory, information sharing, packaging, order handling, distribution and product scheduling, warehousing and finished good handling, transportation and coordination, and acquisition (Independent variables)	0.805	0.000	2

Based on the sample survey (2011)

5.10.2.3 Discriminant validity of each construct

Table 5.5 shows that each construct of innovation in distribution channel as individual variables; Innovation in inventory, information sharing, packaging, order handling, distribution and product scheduling, warehousing and finished good handling, transportation and coordination, and acquisition, as well as other constructs consisted in one component.

Table 5.5 Discriminant Validity Test: Result for each construct

Innovation in assortment

Construct	Component 1
In_Assortment_1	0.938
In_Assortment_2	0.911
In_Assortment_3	0.916
In_Assortment_4	0.881
In_Assortment_5	0.703

Innovation in forecasting and order handling

Construct	Component 1
In_Order_1	0.967
In_Order_2	0.956
In_Order_3	0.951
In_Order_4	0.923
In_Order_5	0.910

Innovation in product and distribution scheduling

Construct	Component 1
In_Scheduling_1	0.970
In_Scheduling_2	0.964
In_Scheduling_3	0.973
In_Scheduling_4	0.962
In_Scheduling_5	0.939

Innovation in information sharing

Construct	Component 1
In_Info_Sharing_1	0.951
In_Info_Sharing_2	0.976
In_Info_Sharing_3	0.945
In_Info_Sharing_4	0.969
In_Info_Sharing_5	0.901

Innovation in inventory

Construct	Component 1
In_Inventory_1	0.927
In_Inventory_2	0.917
In_Inventory_3	0.888
In_Inventory_4	0.916
In_Inventory_5	0.837

Innovation in packaging

Construct	Component 1
In_Packaging_1	0.844
In_Packaging_2	0.904
In_Packaging_3	0.825
In_Packaging_4	0.930
In_Packaging_5	0.900

Innovation in transportation and coordination

Construct	Component 1
In_Trans_1	0.849
In_Trans_2	0.943
In_Trans_3	0.938
In_Trans_4	0.964
In_Trans_5	0.877

Innovation in warehousing

Construct	Component 1
In_Warehousing_2	0.818
In_Warehousing_3	0.757
In_Warehousing_5	0.759
In_Warehousing_7	0.924
In_Warehousing_8	0.864

Innovation in acquisition

Construct	Component 1
In_Acquisition_1	0.866
In_Acquisition_2	0.910
In_Acquisition_3	0.901
In_Acquisition_4	0.490
In_Acquisition_5	0.827
In_Acquisition_6	0.887
In_Acquisition_7	0.849

competitive environment

Construct	Component 1
Env_Host_5	0.805
Env_Host_6	0.716
Env_Host_7	0.877
Env_Host_8	0.879

Distribution Effectiveness

Construct	Component 1
Dist_Effect_1	0.933
Dist_Effect_4	0.933

Firm performance

Construct	Component 1
Exp_Economic_5	0.896
Exp_Economic_6	0.835
Exp_Economic_7	0.885

Distribution Efficiency

Construct	Component 1
Dist_efficiency_5	0.917
Dist_efficiency_6	0.906
Dist_Efficiency_7	0.836

5.10.3 Assessing the normality of the data

The assumption of normality is a prerequisite for all parametric tests. A normal set of data is represented by a bell-shaped curve which has the greatest frequency of scores in the middle and smaller ones towards the ends of the curve (Burns, 2000, p. 68). Thus, normality is often assessed graphically – through histograms, stem-and-leaf plots, box plots, and normal plots (Pallant, 2005). In addition, there are statistics, such as the Kolmogorov-Smirnov (K-S), Shapiro-Wilks (S-W), kurtosis and skewness, which may also help to determine normality. In this study, normality was assessed for all six sets of interval data using the SPSS.

Apart from graphical interpretation of the results, perfect normality may also be indicated by values of kurtosis and skewness and therefore, this study used skewness or kurtosis to measure the data distribution. If the value of skewness and kurtosis fulfil between -2.00 and

+2.00, it means that the normality of the data is considered acceptable. The results portrayed in Table 5.6 show the normality of the data sample :

However, inspection of the skewness and kurtosis results revealed that all values fulfilled within the range of -2.0 to +2.0, thus indicating that the data did approach normality (George & Mallory, 1995).

Table 5.6 Normality of data

Construct	Skewness	Kurtosis
Firm size asset	0.945	0.204
Age of company	0.893	0.494
Sector	0.068	-2.00
Competitive environment hostility	0.013	-0.208
Innovation in assortment	0.683	-0.836
Innovation in order handling	0.238	-1.337
Innovation in information sharing	0.839	-0.636
Innovation in product and distribution scheduling	0.907	-0.502
Innovation in inventory	1.068	-0.125
Innovation in transportation coordination	1.235	0.048
Innovation in packaging	0.232	-0.884
Innovation in warehousing and product handling	0.203	-0.830
Innovation in acquisition	0.215	-0.758
Distribution effectiveness	-0.171	0.315
Distribution efficiency	0.719	1.160
Firm performance economic	-0.118	0.290

Based on the sample survey.2011

5.11 Parametric tests

In the study, a combination of parametric tests was used to examine the relationship of the variables of independent, control, mediator, and dependent variables. Correlation was intended to analyse how innovation in distribution channel variables; Innovation in assortment, order handling, product distribution scheduling, information sharing system, inventory, packaging, transportation coordination, warehousing and product handling, and acquisition as independent variables, firm size, competitive environment hostility, age of

company, and industry sector had relationship with distribution channel performance and directly with firm performance economic indicator. Bivariate regression was used to analyse individual direct effect of the variables, while multiple regression was intended to analyse how innovation in distribution channel variables worked; Innovation in assortment, order handling, product distribution scheduling, information sharing system, inventory, packaging, transportation coordination, warehousing and product handling, and acquisition as independent variables, firm size, competitive environment hostility, age of company, and industry sector. Multivariate analysis analysed collectively how innovation in distribution channel, as mentioned above, effected distribution channel performance and directly with firm performance economic indicator, which examined the collective direct effect of the independent and control variables on the distribution performance and firm performance.

5.12 Summary

Primary data were collected and analysed from the field survey on 120 data of export oriented established SMEs wide spread throughout DIY Yogyakarta and surroundings-Java Indonesia, which were agriculture based industries- by and large wooden. Using seven points of scales, the questionnaires comprised of items in exploring the role of innovation in product distribution channels, including control variables leading to firm performance. With the intention of appraising innovation in product distribution channels on firm performance, the owners or the top managers were asked straightforwardly regarding distri bution channel innovation implementations.

Nevertheless, a pilot study was conducted before continuing up to 120 respondents to be analysed. Quantitative procedures were proceeded to ensure the reliability and validity of

the data. Normal distribution was also assured before being proceeded to further quantitative analysis. Besides correlation and multiple regression, Baron, and Kenney's (1986) approach was used to examine the mediating effect of distribution performance between the relationship of innovation in distribution channel and firm performance.