Chapter 6
EMPIRICAL FINDINGS And ANALYSES

6.1 Introduction

The chapter discusses the results obtained from the quantitative data analysis procedures. Parametric tests were executed in this study. The results did not only demonstrate significant relationships, but also the implications of innovation in distribution channel activities upon economic firm performance of export oriented SMEs in Indonesia that would support the objectives of the study.

6.2 Descriptive Analysis

6.2.1 Profile of the respondents

Distribution of the sampling unit according to entrepreneur profile, total number of employees, industry sector, net asset excluding lands and buildings, type of the firms, and firm's age are portrayed in Table 6.1 and Figure 6.1. As seen in the table and the figure, the majority of the sampled population were export oriented SMEs that focused on the agriculture sector based industries. Such characteristics, hence, made them very local intensive or much less dependent on imported raw materials, machinery equipments, and other inputs for the production process. On the basis of this idea, the Indonesian SMEs had been expected to have strong production linkage with agriculture, which would drive better agriculture sector performance (Tulus, 2000).

As observed in Table 6.1 and Figure 6.1, in terms of total numbers of permanent (full time) and non permanent employees, they showed that the percentage of the SMEs that hired 15

- 27 employees were the highest (44% of the total establishments), whilst between 0-14 employees usually were run by family members of the owners. On the other hand, the SMEs who hired between 30-61 workers tended to be more professional and managed officially than the others. The study also found that about one-third (34%) of the business owned net assets (excluding land and buildings) were in the range of IDR 50,000,000 - 150,000,000. Only 7% of the businesses owned net assets (excluding land and building) between IDR 20,000,000 - 43,370,000.

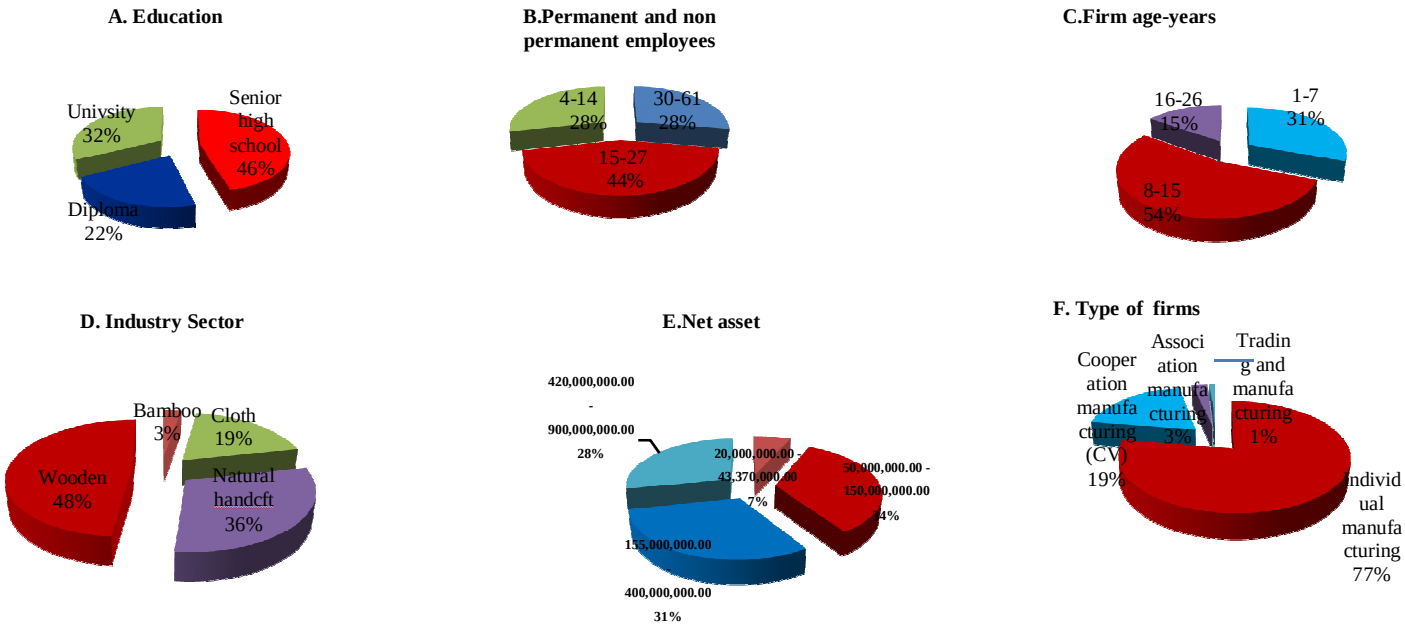
Surprisingly, entrepreneurs with senior high school education formed the majority of the respondents (4% of the total), whilst the respondents with university degree were (33%), and followed by diploma holders (22%). Table 6.1 also demonstrated that most of the SMEs (77.5%) were individual private companies. Nonetheless, most of the SMEs were engaged in production operation. Very few of them (0.8%) were engaged in both manufacturing and trading. On the whole, about half (54%) of the SMEs had operated between 8 and 15 years, while only 15% were in the market for 16-26 years.

Table 6.1 Profiles of the respondents (SMEs)

Characteristics	Frequency	%
Entrepreneur profile		
Senior high school	55	46%
Diploma	26	22%
Degree	39	33%
Total respondents	**120**	**100%**
SMEs profile		
Total number of permanent(full time) and non permanent employees		
0-14	34	28%
15-27	53	44%
30-61	33	28%
Total respondents	**120**	**100%**
Industry sector		
Bamboo	3	2.50%
Clothing	23	19.20%
Natural handicraft	36	30%
Wooden Industries	58	48.30%
Total respondents	**120**	**100%**
Net asset (IDR)		
20,000,000.00 - 43,370,000.00	8	7%
50,000,000.00 - 150,000,000.00	41	34%
155,000,000.00 - 400,000,000.00	37	31%
420,000,000.00 - 900,000,000.00	34	28%
Total respondents	**120**	**100%**
Type of the firms		
Individual manufacturing	93	77.50%
Cooperation manufacturing (CV)	23	19.20%
Association manufacturing	3	2.50%
Trading and manufacturing	1	0.80%
Total respondents	**120**	**100%**
Firms' age		
1 – 7	37	31%
8 -15	65	54%
16-26	18	15%
Total respondents	**120**	**100%**

Author survey (2011)

Figure 6.1 Respondents' profile as described from table 6.1



6.2. 2 Descriptive statistics

This correlation technique was intended to determine the strength and direction of the linear relationship between two continuous variables. Here, the objective is to analyse how correlation among variables occur (Table 6.2).

Table 6.2 Correlation among variables

				Correlations														
Var		Mean	St Dev	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Firm size	1	2.81	2.26															
Age of firm	2	10.53	6.107	0.221*														
Sector	3	1.48	.502	-0.163	-0.149													
Hostility	4	14.69	4.256	0.232*	0.004	-0.052												
Assortment	5	11.53	7.580	0.102	0.041	-0.139	0.143											
Order handling	6	14.90	9.516	-0.199*	-0.033	0.015	-0.075	0.186*										
Information	7	12.70	9.698	0.150	-0.152	-0.146	0.044	0.393**	0.506**									
Scheduling	8	11.48	8.554	-0.075	-0.263**	-0.121	0.163	0.416**	0.345**	0.528**								
Inventory	9	10.71	7.503	0.122	-0.139	-0.181*	0.373**	0.374**	0.116	0.439**	0.447**							
Transportation	10	10.26	8.250	-0.040	-0.091	-0.095	0.220*	0.405**	0.316**	0.370**	0.447**	0.353**						
Packaging	11	14.63	7.840	0.201*	-0.079	-0.069	0.397**	0.485**	0.193*	0.373**	0.423**	0.493**	0.401**					
Warehousing	12	14.38	7.378	0.018	-0.030	-0.011	0.187*	0.307**	0.336**	0.315**	0.289**	0.407**	0.316**	0.463**				
Acquisition	13	20.89	10.949	-0.242**	0.049	-0.125	0.120	0.359**	0.277**	0.368**	0.355**	0.359**	0.413**	0.184*	0.343**			
Effectiveness	14	10.28	1.945	0.297**	0.135	-0.150	0.051	0.339**	0.193*	0.420**	0.177	0.277**	0.349**	0.243**	0.257**	0.309**		
Efficiency	15	12.21	2.947	0.053	-0.107	-0.160	0.347**	0.240**	0.064	0.422**	0.346**	0.335**	0.386**	0.293**	0.394**	0.281**	0.309**	
Firm performance	16	13.57	3.191	0.244**	-0.050	-0.057	0.051	0.322**	0.127	0.374**	0.166	0.114	0.274**	0.268**	0.154	-0.006	0.597**	0.353**

Notes: *. Correlation is significant at the 0.05 level (2-tailed),
**. Correlation is significant at the 0.01 level (2-tailed).

In terms of innovation in distribution channels and distribution effectiveness, the correlation matrix indicated that there was a positive significant relationship up to 95% confidence level between innovation in distribution channels and distribution effectiveness. With the exception of innovation in product and distribution scheduling, innovation in distribution channel activities variables were respectively found to have significant positive relations with distribution effectiveness, as summarized in Table 6.3.

Table 6.3 Correlation: Distribution Effectiveness

Variables (distribution channel activities)	**P-value**
innovation in assortment	0.339**
innovation in order handling processing	0.193*
innovation in information sharing	0.420**
innovation in inventory	0.277**
innovation in packaging	0.243**
innovation in transportation coordination	0.349**
innovation in warehousing and finished product handling	0.257**
innovation in acquisition	0.309**

Note: *p<0.05; **p<0.01

These findings appeared to be consistent with the existing literatures. Only innovation in product and distribution scheduling was not significantly correlated with distribution effectiveness, while the others were significant. In summary, the strength of the relationship between innovation in information sharing and distribution effectiveness was the most significant, whilst innovation in order handling and distribution effectiveness relationship was the least significant.

As seen in Table 6.4, in terms of control variables' relationship with variability of distribution effectiveness: Firm size, age of company, competitive environment hostility,

and industry sector, indicated that firm size was found significant at p=0.297 at 0.01 level, while age of company, competitive environment hostility, and industry sector were found insignificant. The results gave some conclusion that only firm size in terms of net asset had a significant relationship with distribution performance in terms of effectiveness, while the others did not.

Table 6.4 Correlation: Distribution Effectiveness

Variables	**P-value**
Firm size	0.297**

Note: *p<0.05; **p<0.01

On the other hand, as demonstrated in the Table 6.5., in terms of efficiency, based on the same data set, the signs of the Pearson Correlation Coefficient (r-value) showed that: innovation in assortment was found positively significant at 0.01 level (p = 0.240), innovation in order handling processing was not significant, innovation in product and distribution scheduling was positively significant at 0.01 level (p = 0.346), innovation in information sharing was positively significant at 0.01 level (p = 0.422), innovation in inventory was positively significant at 0.01 level (p = 0.335), innovation in packaging was positively significant at 0.01 level (p = 0.293), innovation in transportation coordination was positively significant at 0.01 level (p = 0.386), innovation in warehousing and finished product handling was positively significant at 0.01 level (p = 0.394), and innovation in acquisition was positively significant at 0.01 level (p = 0.281).

Table 6.5 Correlation: Distribution Efficiency

Variables (distribution channel activities)	**P-value**
innovation in assortment	0.240**
innovation in information sharing	0.422**
innovation in product and distribution scheduling	0.346**
innovation in inventory	0.335**
innovation in packaging	0.293**
innovation in transportation coordination	0.386**
innovation in warehousing and finished product handling	0.394**
innovation in acquisition	0.281**

Note: *p<0.05; **p<0.01

In summary, the strength of the relationship between innovation in information sharing and distribution efficiency was the most significant, while the relationship between innovation in assortment and distribution efficiency was the least significant.

As seen in Table 6.6, in terms of control variables' relationship with distribution efficiency performance: Firm size, age of company, and industry sector were found not significant, while competitive environment hostility was found at 0.01 level at p = 0.347, the result concluded that only competitive environment was found significant with distribution performance in terms of efficiency.

Table 6.6 Correlation: Distribution Efficiency

Variables	**P-value**
Competitive environment hostility	0.347**

Note: *p<0.05; **p<0.01

6.3 Regression analysis of the mediating effect

This section particularly extents the analysis in the previous section to examine the mediator effect of distribution channel performance (effectiveness and efficiency) on the relationship between the distribution channel innovation and firm economic performance using multiple regression derived from the Baron, & Kenney's approach (1986).

6.3.1 Multicollinearity

The first step in this analysis was to test the presence of multicollinearity in the regression model. When the predictor variables are highly correlated with one another- $r > 0.9$ (Pallant, 2005), multicollinearity is said to exist which may result in a poor regression model. Inspection of all correlation interaction, as seen in Table 6.2, showed that the independent variables: Innovation in assortment, order handling, product and distribution scheduling, information sharing system, transportation coordination, warehousing and product handling, inventory, packaging, and acquisition in this study had values not more than 0.550 or $r < 0.7$, which proved that the problem of multicollinearity in the regression model is considered negligible (Pallant, 2005).

6.3.2 Simple regression

According to Bowersox *et al.,* (1986), distribution channel is supposed to be designed to fulfil five (5) basic functions: adjustment or assortment, transfer or transportation, storage, handling and communication. In the meantime, Walters (1977) asserts that distribution channel operations or activities are classified into two general groups-assortment and logistics. Hence, referring to the concept proposed by Walters (1977), this study classified distribution channel innovation into: assortment and logistic activities. By using factor

analysis, this study further grouped logistic activities into 2 (two) sub groups: order handling and logistics.

In terms of distribution channel performance, this study classified distribution channel performance into two main performance indicators: effectiveness and efficiency. Based on the conceptual framework discussed earlier (as illustrated in Figure 5.1), the study examined if distribution effectiveness and distribution efficiency mediated the relationship between distribution channel innovations and SMEs performance.

In terms of effectiveness, Table 6.7 shows that innovation in assortment and order handling were respectively significant predictors of distribution effectiveness up to 95% confidence level and might respectively explain roughly for 12% (R-square = 0.115) and 4% (R-square = 0.037). From another perspective of distribution channel performance, Table 6.7 displays that innovation in assortment was a significant predictor (up to 95% confidence level) of the variability in distribution efficiency and it explained roughly 6% (R-square = 0.058) as well. On the contrary, innovation in order handling was not significantly associated with distribution efficiency.

Table 6.7 Simple regression

Regression	**Dependent variables**	**R-Square**	**Adj R-Square**	***β***	**t**	**p-value**
Innovation in :						
Assortment	Effectiveness	0.115	0.107	0.087	3.914	0.000***
Order handling	Effectiveness	0.037	0.029	0.039	2.138	0.035*
Assortment	Efficiency	0.058	0.050	0.093	2.688	0.008**
Order handling	Efficiency	0.020	0.004	-0.004	0.693	0.490

Source: Based on the sample survey. Note: * p<0.05; **p<0.01; ***p<0.001

6.3.3 Multiple regression : Types of innovation in distribution channel activities to distribution effectiveness and efficiency (Research objective 1)

Multivariate analysis examines the simultaneous effect of multiple independent variables. In the study, multiple regression was employed to examine the impact of innovation distribution channels on distribution performance. The following analysis, therefore, tested the independent variables by multiple regression, in which the results are as in the following:

With respect to distribution effectiveness, the data set, as seen in Table 6.9, demonstrated that innovation in information sharing system and innovation in transportation coordination were significant predictors of distribution channel effectiveness (up to 95% confidence level), while others were not.

Table 6.8 Multiple regression,
Dependent variable: distribution effectiveness

Variables (Innovation in)	***β***	**P -value**
Information sharing	0.070	0.001**
Product and distribution scheduling	-0.046	0.060
Inventory	0.014	0.593
Transportation and coordination	0.049	0.040*
Packaging	0.010	0.716
Warehousing and product handling	0.015	0.548
Acquisition	0.021	0.221
Constant	8.460***	
R^2	0.260	
Adjusted R^2	0.214	
F	5.615***	

Source: Based on the sample survey.
Note: * p<0.05; **p<0.01; ***p<0.001

In terms of distribution efficiency, the results of multi linear regression, as shown in Table 6.9, found that innovation in information sharing, transportation coordination, and

warehousing and finished good handling were significant predictors of distribution channel efficiency (up to 95% confidence level), while others were not.

Table 6.9 Multiple regression,
Dependent variable: distribution efficiency

Variables (innovation in)	***β***	**P -value**
Information sharing	0.071	0.021*
Product and distribution scheduling	0.019	0.595
Inventory	0.024	0.552
Transportation and coordination	0.069	0.049*
Packaging	-0.012	0.755
Warehousing and product handling	0.093	0.016*
Acquisition	8.17	0.997
Constant	8.963***	
R^2	0.295	
Adjusted R^2	0.251	
F	6.691***	

Source: Based on the sample survey.
Note: * p<0.05; ** p<0.01; *** p<0.001

6.3.4. Hierarchical regression: Distribution effectiveness as mediator

In this hierarchical analysis, innovation in distribution channels was included all together group by group as pictured in the model (Figure 1). Hence, in terms of effectiveness, as seen in Table 6.10, six empirical models were estimated to evaluate the impact of distribution channel effectiveness as a mediator between the relationship of innovation in distribution channels and firm performance (Shu-Chi Lin, & Yin-Mei Huang, 2006; Baron, & Kenney's, 1986). Moving from Model 1 through Model 6 showed that (the R^2) improved significantly with the inclusion of one variable after the other.

Firstly, the relationship of the control variables with firm performance was estimated as in Model 1. Model 1 demonstrated that firm size had a significant relationship with firm performance ($\beta = 3.76$, $p < 0.001$). However, when distribution effectiveness was included with the control variables, as shown in Model 2, none of the control variables had

significant relationship with firm performance. Secondly, innovation in assortment was included in the next estimation, as shown in Model 3. It was found that innovation in assortment had significant relationship with firm performance (β = 0.130, p < 0.01). Afterwards, innovation was included in order handling, as seen in Model 4 and it was found that innovation in order handling was not significantly associated with firm performance.

Next, logistic innovation was included in the estimation (Model 5) and it showed that controlling from firm size, firm age, the industry, and competitive environment hostility, Model 5 demonstrated that innovation in assortment (β = 0.091, p < 0.05), information sharing (β = 0.122, p < 0.01), and transportation coordination (β = 0.082, p < 0.05) had positive and significant relationship with firm performance respectively. In contrast, the other distribution channel dimensions were not statistically significant.

The last step was to include all independent variables with distribution effectiveness in the estimation (Model 6). Based on Baron, & Kenny's (1986) approach, if the inclusion of the distribution channel effectiveness variable eliminated the significance of the three innovative distribution channel dimensions, then the effectiveness variable was a mediator. As shown in Model 6, the effectiveness variable did eliminate the significance of the innovative distribution channel dimensions, particularly the assortment and transportation coordination. This suggests that the effectiveness of distribution channel mediated the relationship between innovation in assortment and transportation coordination and firm performance, but it did not mediate the innovation in other distribution channel dimensions. Hence, the hypotheses were partly supported.

Table 6.10 Results of the multiple regression analysis-figure.2.
(Dependent variable: SME performance)

Variables	Model 1	2	3	4	5	6
Firm size	3.76**	1.50	3.53**	3.90**	1.77	-7.13
Firm age	-0.060	-0.078	-0.061	-0.062	-0.022	-0.047
Sector	-0.199	0.168	0.042	0.035	0.023	0.059
Hostility	-0.009	-0.002	-0.038	-0.033	-0.011	0.039
Assortment			0.130**	0.119**	0.091*	0.068
Order handling				0.041	-0.024	-0.027
Information sharing					0.122**	0.079*
Product scheduling					-0.034	-0.008
Inventory					-0.063	-0.076
Transportation coordination					0.082*	0.034
Packaging					0.021	0.028
Warehousing					0.024	0.009
Acquisition					-0.057	-0.089
Distribution effectiveness		0.966***				0.948***
Constant	13.569***	3.805*	12.216***	11.570***	11.943***	4.362*
R^2	0.072	0.383	0.164	0.177	0.281	0.494
Adjusted R^2	0.040	0.356	0.127	0.134	0.193	0.426
ΔR^2	0.072	0.312	0.092	0.014	0.104	0.213
F	2.227	14.179***	4.463**	4.063**	3.188***	7.317***

Source: Based on the sample survey. Note: * p<0.05; ** p<0.01; *** p<0.001

6.3.5 Hierarchical regression: Distribution efficiency as a mediator

In terms of efficiency, as seen in Table 6.11, six empirical models were also estimated to evaluate the impact of distribution channel efficiency as a mediator between the relationship of innovation in distribution channels and firm performance (Shu-Chi Lin, & Yin-Mei Huang, 2006; Baron, & Kenney, 1986). Beginning from Model 1 through Model 6, it could be seen that the instructive power of the model (the R^2) enhanced significantly with the insertion of one variable after the other.

As read in Table 6.11, initially, the control variables were included in the estimation, as addressed earlier in the distribution effectiveness estimation. As seen in Model 1, the case of distribution effectiveness as a mediator between the relationship of innovation in distribution channels and firm performance, firm size ($\beta = 3.76$, $p < 0.01$) had a significant

relationship with firm performance. When the distribution efficiency variable was included with the control variables in the estimation, as appeared in Model 2, only firm size had a significant relationship with firm performance ($\beta = 0.390$, $p < 0.01$). Next was to include innovation in assortment in the estimation (Model 3), which demonstrated that innovation in assortment ($\beta = 0.123$, $p < 0.01$) had a significant relationship with firm performance. Furthermore, innovation was included in order handling, as seen in Model 4. It could be seen innovation in order handling was not significant with firm performance.

In the next step, we included logistic innovation in the estimation (Model 5) showed that information sharing ($\beta = 0.122$, $p < 0.01$) and transportation coordination ($\beta = 0.082$, $p < 0.05$) had positive and significant relationship with firm performance respectively. In contrast, the other distribution channel dimensions were not statistically significant.

The last step was to include all independent variables with distribution effectiveness in the estimation (Model 6). Based on the Baron, & Kenny's (1986) approach, if the inclusion of the distribution channel efficiency variable eliminated the significance of the three innovative distribution channel dimensions, then the efficiency variable was a mediator. As shown in Model 6, the efficiency variable did eliminate the significance of the innovative distribution channel dimensions, particularly information sharing and transportation coordination. This suggests that the efficiency of distribution channel mediated the relationship between innovation in information sharing and transportation coordination and firm performance, but it did not mediate the innovation in other distribution channel dimensions. Hence, the hypotheses were partly supported.

Table 6.11 Results of the multiple regression analysis-figure.2.
(Dependent variable: SME performance)

	Model					
Variables	1	2	3	4	5	6
Firm size	3.76**	3.90**	3.53**	3.90**	1.77	2.308
Firm age	-0.060	-0.034	-0.061	-0.062	-0.022	-0.021
Sector	-0.199	0.207	0.042	0.035	0.023	0.199
Hostility	-0.009	-0.110	-0.038	-0.033	-0.011	-0.076
Assortment			0.130**	0.119**	0.091*	0.096*
Order handling				0.041	-0.024	0.008
Information sharing					0.122**	0.076
Product scheduling					-0.034	-0.041
Inventory					-0.063	-0.050
Transportation coordination					0.082*	0.059
Packaging					0.021	0.034
Warehousing					0.024	-0.017
Acquisition					-0.057	-0.055
Distribution efficiency		0.419***				0.312**
Constant	13.569***	9.011***	12.216***	11.570***	11.943***	9.247***
R^2	0.072	0.198	0.164	0.177	0.281	0.327
Adjusted R^2	0.040	0.163	0.127	0.134	0.193	0.238
ΔR^2	0.072	0.126	0.092	0.014	0.104	0.046
F	2.227	5.632***	4.463**	4.063**	3.188***	3.650***

Source: Based on the sample survey. Note: * $p<0.05$; ** $p<0.01$; ***$p<0.001$

6.4 Plotted coefficient in terms of effectiveness

In order to determine the total effects of all exogenous variables on the endogenous variable, path analysis is extremely useful as it allows the calculation of the indirect effect of each exogenous variable. The comparison of direct and indirect effects of a predictor is required to measure the mediating function of the intervening variables (Ahmad, 2004). A path analysis is a straightforward extension of multiple regression. It makes use of path diagram in which unidirectional arrows are drawn from the exogenous variables to the endogenous variables (Pedhazur, 1997).

The full-effects model is depicted in Figure 6.2, whereby each variable was denoted with a number to facilitate path identification. The unidirectional arrows signify all possible paths

connecting each exogenous variable to the endogenous variable. At this stage of analysis, a series of multiple regression (Beardon, & Teel, 1982) was carried out to derive the various path coefficients for the full-effects model and in turn, identified the significant paths. The regressions were carried out according to the following equations, allowing for error, e:

X1 = e1

X14a = p14a 5X5 + e14a

X14a = p14a 6X6 + e14a

X14a = p14a 7X7 + p14a 8X8 + p14a 9X9 +p14a 10X10 + p14a 11X11+p14a 12X12+p14a 13X13+ e14a

X15 = p15 1X1 + p15 2X2 + p15 3X3 + p15 4X4 + p15 5X5 +p15 6X6 + p15 7X7+p15 8X8+p15 9X9+p15 10X15+p15 11X11+p15 12X12+p15 13X13+p15 14aX14a+ e15

The notations p21X1, p31X1, etc indicated specific path coefficients. For instance, p21X1 signifies the path coefficient relating the exogenous variable X1 to the endogenous variable X2. Table 6.12 summaries the results of the multiple regressions on the full-effects model.

Table 6.12 Results of the path analysis in terms of effectiveness

Regression	R-Square	Adjusted R-square	β Unst	β Stand	Sig p-value
P14a5X5	0.115	0.107	0.087	0.339	0.000***
P14a6X6	0.037	0.029	0.039	0.193	0.035*
P14a7X7	0.260	0.214	0.070	0.348	0.001**
P14a8X8			-0.046	-0.200	0.060
P14a9X9			0.014	0.056	0.593
P14a10X10			0.049	0.207	0.040*
P14a11X11			0.010	0.038	0.716
P14a12X12			0.015	0.059	0.548
P14a13X13			0.021	0.119	0.221
P151X1	0.494	0.426	-7.13	-0.051	0.582
P152X2			-0.047	-0.090	0.260
P153X3			0.059	0.009	0.900
P154X4			0.039	0.051	0.537
P155X5			0.068	0.160	0.073
P156X6			-0.027	-0.080	0.384

P157X7	0.079	0.240	0.027*
P158X8	-0.008	-0.022	0.821
P159X9	-0.076	-0.180	0.061
P1510X10	0.034	0.088	0.321
P1511X11	0.028	0.068	0.493
P1512X12	0.009	0.021	0.811
P1513X13	-0.089	-0.305	0.001**
P1514aX14	0.948	0.578	0.000***

Source: Based on the sample survey.
Note: * p<0.05; ** p<0.01; *** p<0.001

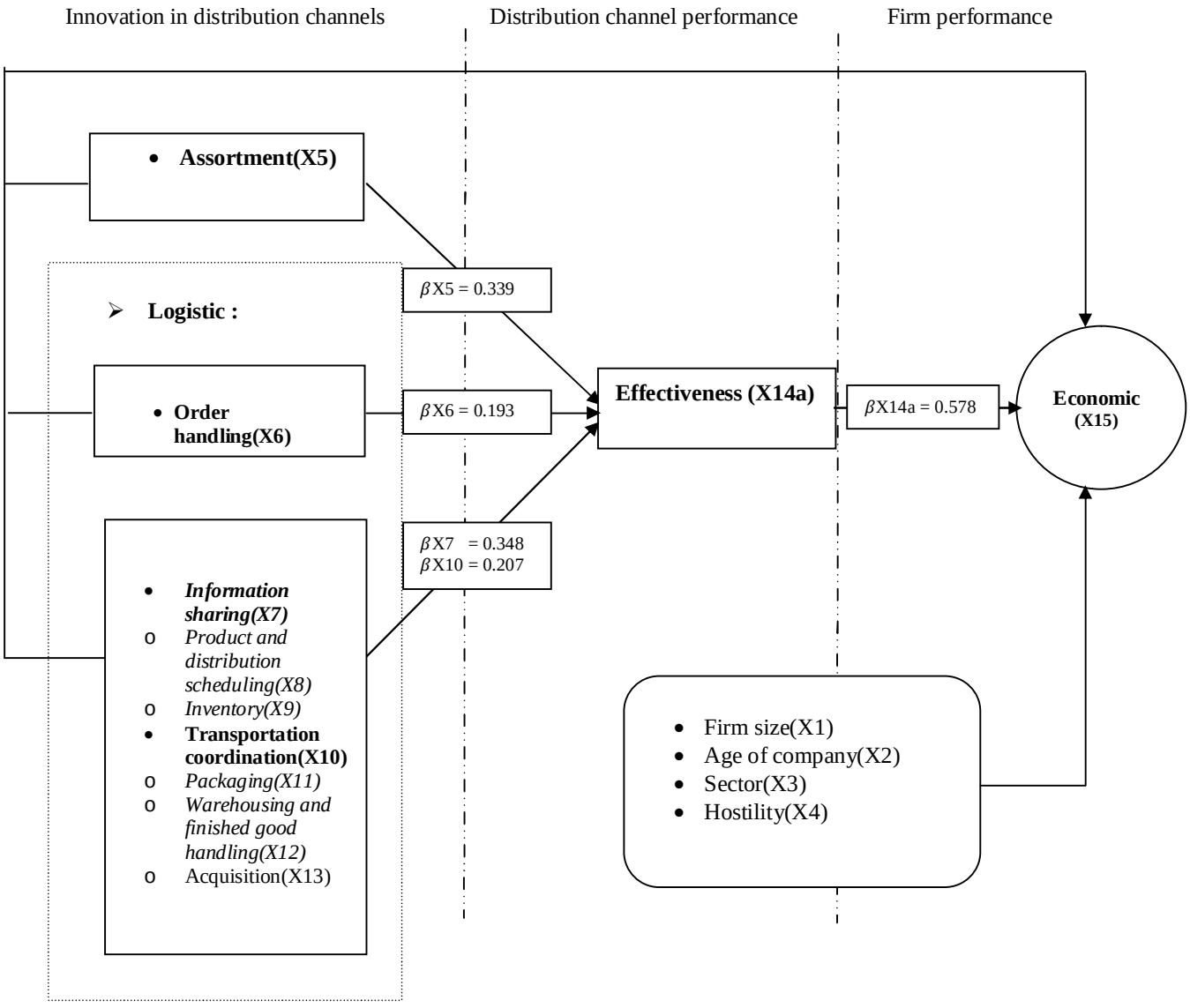


Figure 6.2: The plotted coefficient in terms of effectiveness

6.5 Plotted coefficient in terms of efficiency

The full-effects model is depicted in Figure 6.3, where each variable is denoted with a number to facilitate path identification. The unidirectional arrows signify all possible paths connecting each exogenous variable to the endogenous variable. At this stage of analysis, a series of multiple regression (Beardon, & Teel, 1982) was carried out to derive the various path coefficients for the full-effects model and in turn, identify the significant paths. The regressions were carried out according to the following equations, allowing for error, e:

X1 = e1

X14b = p14b 5X5 + e14b

X14b = p14b 6X6 + e14b

X14b = p14b 7X7 + p14b 8X8 + p14b 9X9 +p14b 10X10 + p14b 11X11+p14b 12X12+p14b 13X13+ e14b

X15 = p15 1X1 + p15 2X2 + p15 3X3 + p15 4X4 + p15 5X5 +p15 6X6 + p15 7X7+p15 8X8+p15 9X9+p15 10X10+p15 11X11+p15 12X12+p15 13X13+p15 14bX14b+ e15

The notations p21X1, p31X1, etc indicate specific path coefficients. For instance, p21X1 signifies the path coefficient relating the exogenous variable X1 to the endogenous variable X2.

Summaries of the results of the multiple regressions on the full-effects model:

Table 6.13: Results of the path analysis in terms of efficiency

Regression	R-Square	Adjusted R-square	β Unst	β Stand	Sig p-value
P14b5X5	0.115	0.107	0.093	0.240	0.008**
P14b6X6	0.020	0.004	-0.004	0.064	0.490
P14b7X7	0.295	0.251	0.071	0.234	0.021*
P14b7X8			0.019	0.055	0.595
P14b8X9			0.024	0.060	0.552
P14b9X10			0.069	0.193	0.049*
P14b10X11			-0.012	-0.032	0.755
P14b11X12			0.093	0.233	0.016**
P14b12X13			8.17	0.000	0.997
P151X1	0.327	0.238	2.31	0.164	0.112
P152X2			-0.021	-0.041	0.657

P153X3	0.199	0.031	0.714
P154X4	-0.076	-0.102	0.312
P155X5	0.096	0.228	0.027*
P156X6	0.008	0.025	0.822
P157X7	0.076	0.232	0.081
P158X8	-0.041	-0.110	0.316
P159X9	-0.050	-0.116	0.292
P1510X10	0.059	0.151	0.142
P1511X11	0.034	0.084	0.464
P1512X12	-0.017	-0.039	0.712
P1513X13	-0.055	-0.187	0.079
P1514bX14b	0.312	0.288	0.008**

Source: Based on the sample survey.
Note: *p<0.10, ** p<0.05; *** p<0.01; **** p<0.001

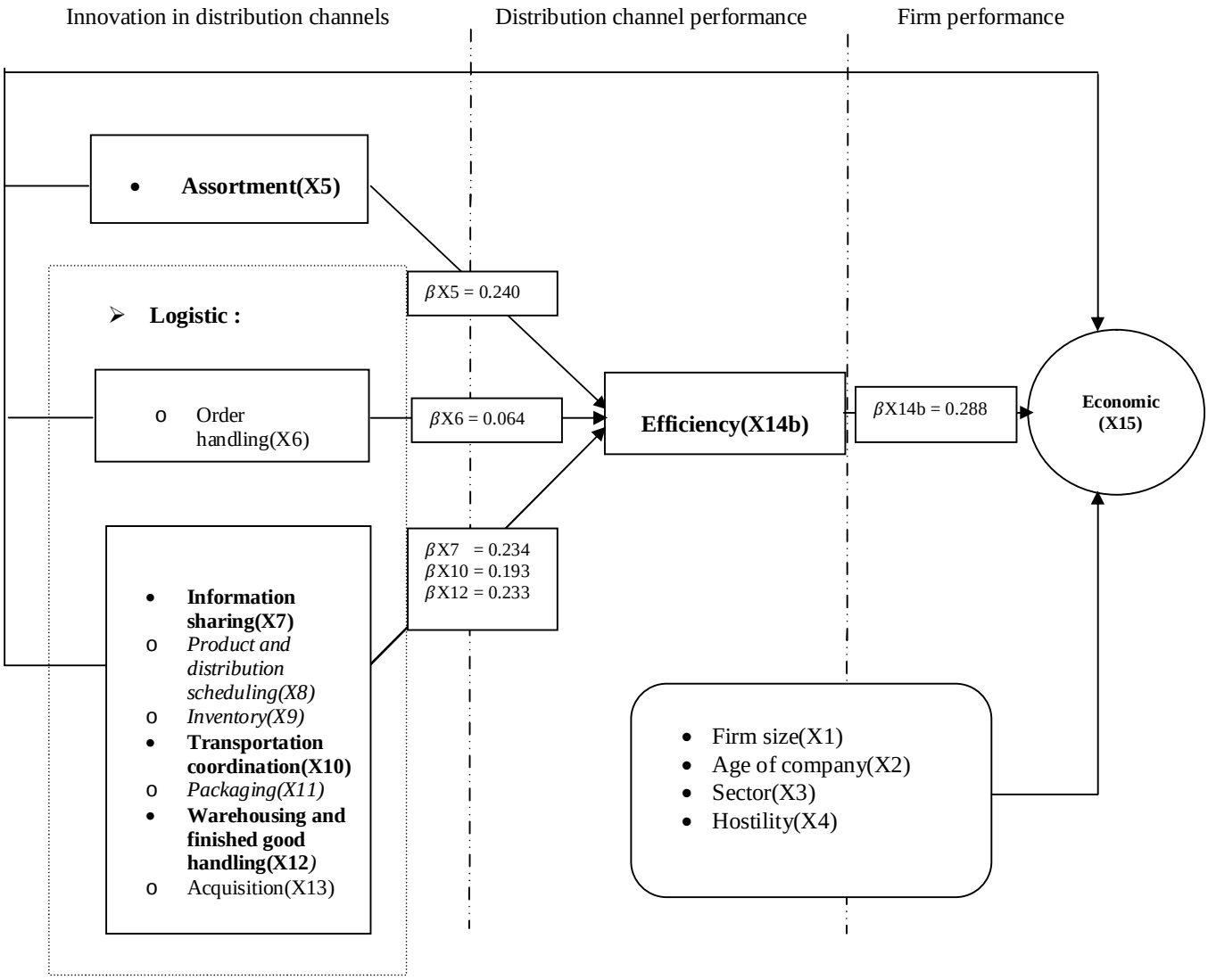


Figure 6.3: The plotted coefficient in terms of distribution efficiency

6.6 Hypotheses testing

The following hypotheses testing are derived from Table 6.3 up to Table 6.11.

H1a and H1b : Innovation in assortment is positively associated with distribution channel performance in terms of effectiveness (H1a), and efficiency (H1b).

From the data set, the result of the correlation analysis indicated that the correlation coefficient between innovation in assortment with distribution channel performance in terms of effectiveness and efficiency for both of them were positively significant at the level (t = 0.001). Each of them indicated (p = 0.399), and (p = 0.240). Simple linear regression further affirmed that innovation in assortment was a significant predictor of distribution effectiveness and efficiency, where each of them was significant (up to the 99% and 95% confidence level) and may explain roughly for each of them 11% (R-square = 0.115) and 6% (R-square = 0.058) of the variability distribution channel performance in terms of effectiveness and efficiency.

Therefore, H1(a &b) are supported: Innovation in assortment was positively associated with distribution channel performance in terms of effectiveness (H1a) and efficiency (H1b).

H.2.(a&b) : Innovation in order handling is positively associated with distribution channel performance in terms of effectiveness(H2a) and efficiency(H2b).

Based on the data set, the result of the correlation analysis indicated that the correlation coefficient between innovation in order handling was significant in terms of effectiveness at (t = 0.05, p = 0.193), but insignificant in terms of efficiency. Simple linear regression also assured that innovation in order handling was a significant predictor of distribution effectiveness up to 95% confidence level and may explain roughly 4% (R-square=0.035).

Therefore, H2a is supported, but H2b is not supported: Innovation in order handling was positively associated with distribution channel performance in terms of effectiveness (H2a), but insignificant in terms of efficiency (H2b).

H3(a&b): Innovation in information sharing is positively associated with distribution channel performance in terms of effectiveness(H3a) and efficiency(H3b).

Referring to the same data set, when innovation in information sharing system was generated on the variability of distribution performance, the result indicated that in terms of effectiveness, innovation in information sharing system was found significant ($\beta = 0.070, p<0.05$). In terms of efficiency, innovation in information sharing system was also found to be significant ($\beta = 0.071, p<0.05$).

Hence, H3(a&b) are supported : Innovation in information sharing system was positively associated with distribution channel performance in terms of effectiveness (H3a) and efficiency (H3b).

H.4(a&b) : Innovation in product and distribution scheduling is positively associated with distribution channel performance in terms of effectiveness (H4a) and efficiency (H4b).

From the 120 primary sample of Indonesia SMEs data set, the result of the multivariate analysis of innovation in product and distribution scheduling when the innovations generated by multiple regression on the dependent variables the result indicated that innovation in product and distribution scheduling was found neither significant in terms of effectiveness nor efficiency.

Therefore, H4(a&b) are not supported : Innovation in product and distribution scheduling was not associated with distribution channel performance in terms of effectiveness (H4a) and efficiency(H4b).

H5(a&b): Innovation in inventory is positively associated with distribution channel performance in terms of effectiveness(H5a) and efficiency(H5b).

The result of the multivariate analysis of innovation in inventory when the innovations were generated by multiple regression on the dependent variables, the result indicated that innovation in inventory was found neither significant in terms of effectiveness nor efficiency.

Thus, H5(a&b) are not supported: Innovation in inventory was not associated with distribution channel performance in terms of effectiveness (H5a) and efficiency(H5b).

H6(a&b): Innovation in packaging is positively associated with distribution channel performance in terms of effectiveness (H6a), and efficiency (H6b).

From the 120 data set, the result of the multivariate analysis of innovation in inventory when the innovations were generated by multiple regression on the dependent variables the result indicated that innovation in packaging was found to be insignificant in terms of effectiveness and efficiency.

Therefore, H6 (a&b) are not supported: Innovation in packaging was not associated with distribution channel performance in terms of effectiveness (H6a) and efficiency.

H.7(a&b): Innovation in transportation coordination is positively associated with distribution channel performance in terms of effectiveness (H7a) and efficiency (H7b).

From the 120 primary sample data, when the innovation in transportation coordination were generated by multiple regression on the dependent variables, the result indicated that innovation in transportation coordination was found significant at ($\beta = 0.049, p<0.05$). In terms of efficiency, it was found significant at ($\beta = 0.069, p<0.05$).

Therefore, H7(a&b) are supported: Innovation in transportation coordination was positively associated with distribution channel performance in terms of effectiveness(H7a) and efficiency (H7b).

H.8(a&b) : Innovation in warehousing and finished good handling is positively associated with distribution channel performance in terms of effectiveness (H8a) & efficiency(H8b).

When the innovation in warehousing and finished good handling were collectively generated on the dependent variables, the result indicated that innovation in warehousing and finished product handling was found significant at ($\beta = 0.093, p<0.05$) in terms of efficiency, but not in terms of effectiveness.

Therefore, H8a was not supported, but H8b was supported: Innovation in warehousing and finished good handling was not associated with distribution channel performance in te rms of effectiveness (H8a) but positively associated with distribution channel performance in terms of efficiency(H8b).

H.9(a&b): Innovation in acquisition is positively associated with distribution channel performance in terms of effectiveness (H9a) and efficiency(9b).

From the data set, the result of the multivariate analysis of innovation in acquisition indicated that it was neither significant in terms of effectiveness nor efficiency.

Therefore, H9 (a&b) are not supported: Innovation in acquisition was not positively associated with distribution channel performance in terms of effectiveness (H9a) and efficiency (H9b).

H10: Distribution channel performance in terms of effectiveness mediates between innovation in distribution channel and firm performance.

From the 120 primary sample, Table 6.10 indicated that distribution channel performance mediated between certain distribution innovations with firm performance.

Therefore, H10 is partly supported: distribution channel performance in terms of effectiveness mediated partly between distribution channel innovation and firm performance.

H11 : Distribution channel performance in terms of efficiency mediates between innovation in distribution channel and firm performance

From the 120 primary sample, Table 6.11 indicated that distribution channel performance in terms of efficiency mediated between certain distribution innovations with firm performance.

Therefore, H11 is partly supported: distribution channel performance in terms of efficiency partly mediated between distribution channel innovation and firm performance.

6.7 Summary

The chapter presented results of the study using a total of 120 samples that were collected from export-oriented, agro based manufacturing SMEs in DIY-Indonesia (Yogyakarta, Bantul, Sleman, and Kulon Progo) and the surrounding areas. Parametric tests in this chapter were executed in order to verify the hypothesis. The first part of the findings is presented in descriptive analysis, while the second part presents the results of the study in multivariate analysis. The results did

not only show significant relationships, but also the implications of innovation in the distribution channel activities upon firm performance of export oriented SMEs agriculture b ased industries.