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A Case Study on the Influence Factors of Financial Performance of Korean Automotive Parts Cooperation Companies through Research Hypothesis

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Abstract

The aim of this research is to contribute to enhancing the competitiveness of automotive parts suppliers while departing from the dependent relationship structure, by developing and interpreting factors that affect sale, which are financial achievements, in a practical way. The research data covered 200 companies from 2013-2017. The study hypothesis was verified by dividing the hypothesis into Model1 with control variables only and Model2 with control variables in independent variables. As a result of hypothesis testing, regarding sales, only capital size showed to have an effect in Model1, while in Model2, asset size, number of employees and joint ventures with foreign companies did but the other remaining factors did not. In particular, the results showed that an increase in financial performance required 'Economies of scale', and that companies that concentrated on a small number of items, diversified products into four or more items, or owned two to four suppliers, reaped positive results in financial performance. Therefore, in addition to the selection and concentration of corporate management for production items and account management, applying strategies, like the inter-company M&A, consortiums and co-branded strategies to achieve 'Economy of scale', would highly enhance the financial performance of automotive parts suppliers.

Key words: Automotive Assembly, Parts Cooperation Company, Financial Performance.

JEL Classification Code: E24, L11, L62.

1. Introduction

1.1. Research Background

Since the 1960s, Korea's automotive industry has grown and developed into a global manufacturing industry that ranks fifth in global automotive sales as an important industry for the nation's economic development. Specifically speaking, the automotive industry is widely associated with other industries; for example, the number of parts required to produce a car is about 25,000, making this industry one

of national scope as it consists of a small number of car assembly and production companies that further interact with numerous related parts suppliers (Lee, 2008). The deterioration of the sales and revenue structure of an automotive assembly and production company (Hereinafter referred to as an 'Automotive Assembly Company') can be fatal to the survival of a company that depends on the production and sales of automotive-related parts (hereinafter defined as a 'Parts Cooperation Company'). Moreover, most of the previous research has been primarily focused on the relationship between car assemblers and parts suppliers, and many parts suppliers to a small number of car assemblers in Korea have formed a highly dependent and one-sided trading relationship within the pyramid scheme of car assemblers. Because of such a dependent relationship, the study of internal analysis of its own in terms of parts cooperation companies was not of interest to researchers. Therefore, there is little research on the parts cooperation companies itself. However, as the fourth industrial revolution progresses, the world's manufacturing

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industry is changing and the automobile industry is as well. In the future, automotive assembly companies will no longer only do business with existing parts cooperation companies. Of course, parts cooperation companies should also move away from one-sided trading relationships and make deals with new clients and seek their own strategies. Therefore, reflecting on how certain internal factors of a parts cooperation companies affected financial performance is one of the implications of this study. Also, this research is intended to contribute to enhancing the financial performance (Kim & Lee, 2004) of a parts cooperation company by validating the factors that affect it through a research hypothesis and interpreting them by hypothetical variables at the company's site practice level. Chapter 1 explains the research procedure, while providing the background of the study, Chapter 2 examines the theoretical background and related prior studies, Chapter 3 presents research procedures and study hypotheses, Chapter 4 describes research data and measurement of variables, and Chapter 5 defines the meaning of each hypothesis variable at the site level while verifying hypotheses through multiple regression analysis. The last six chapters discuss the findings, implications, and the recommended direction of future research.

2. Theoretical Background

2.1. Automotive Assembly Company and Parts Cooperation Company

An automotive assembly company can be defined as a company that produces a vehicle by utilizing parts or modules supplied from a parts cooperation company, while a parts cooperation company refers to a company that manufactures and supplies related car production parts to an auto assembly company. In general, the business-to-business (B2B) approach of a parts-partner's marketing approach is largely based on <Figure 1>, in which a parts cooperation company provides its products to its main customers. From the automotive assembly company's aspect, a Semi-assembly refers to a company that supplies a finished product that is functionally independent in the assembly of an automotive, and a secondary parts cooperation company (Module) means a company that supplies a product that on its own has an independent function. Finally, a third-parts cooperation company (Part) refers to a company that supplies components that are needed to form a module. According to the supply chain, automotive assembly companies generally deal with first tier suppliers of parts, while the second tier to the first tier, and third to the second.

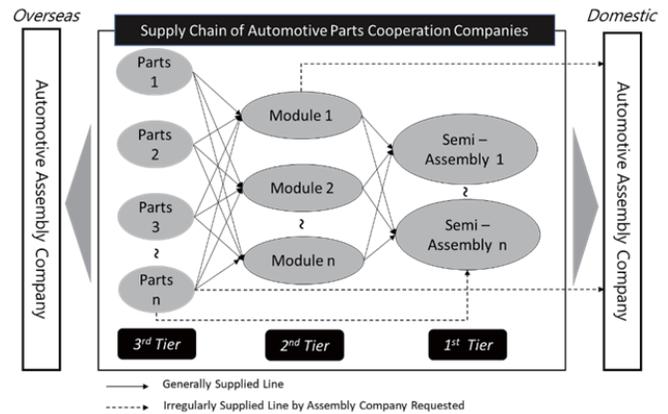


Figure 1: Supply Chain of Automotive Parts Cooperation Companies

In their research, Brandes, Brege, and Brehmer (2013) emphasized the importance of close cooperation between car assemblers and parts suppliers (Sambharya & Banerji, 2006), and Monteverde and David (1982) argued that "automotive assembly companies would depend on their parts suppliers for high switching costs and would choose to produce components vertically." Whereas, Dyer and Chu (2000) declared that although the confidence between an automotive assembly company and a parts cooperation company gives them the advantage of reducing the duration of product development and the defect rate as the two entities are closer, the comparative advantage between an automotive assembly company and a parts cooperation company cannot be attributed to an automotive assembly company. There are many other studies involved. (Bensaou & Venkatraman, 1995; Frazier, Spekman, & O'neal, 1988; Martin, Mitchell, & Swaminathan, 1995).

2.2. Company Size

After Schumpeter's hypothesis that "In larger companies, innovation is more active than in smaller ones," various researchers have presented studies on the size of companies. Symeonidis (1996) describes the size of the company as follows: His research states that the greater the size of the enterprise and the more capital an organization has, the easier it is to push for diversification. Consequently, more diversified enterprises can simultaneously carry out various kinds of research and development tasks; thus, the risks resulting from the success or failure of the R&D tasks are spread out. However, Acs and Audretsch (1987) maintain that "Big companies tend to have a relative innovative advantage in industries that produce capital-intensive, concentrated, highly coupled and differentiated products," while SMEs have a relative advantage in utilizing innovative, skilled labor." Other studies on the relationship between corporate size and corporate growth (Evans, 1987;

Park, Shin, & Kim, 2010; Jovanovic, 1982) could be examined for supplementary knowledge.

2.3. Business Diversification

Business diversification refers to when a particular company produces a product designated for another company or different industry, changing the relationship between the goods and market changes. Also, the diversification of the businesses can also be explained as a means for growth (Lang & Stulz, 1994) when all the internal growth opportunities have been exhausted. The economist James Tobin's also stated that "while companies may use the Tobin q value to make decisions on investments, the value itself is negatively related to diversification." On the other hand, Rumelt (1982) asserted that "Business diversification occurs when an company extends to create and sell a product or when it expands a product line that does not have market interaction with each other's products." Other research has been done, like Chang and Choi (1988), which looked at the relationships of corporate growth under Korea's product diversification strategy, and a study on the corporate performance and diversification for Australia's public industries (McDougal & Round, 1984).

2.4. Experience in Overseas Market

The internationalization of enterprises affects the survival and growth of enterprises through the increase of performance (Lee, 1999; Sambharya & Banerji, 2006). In addition, experience in overseas markets is crucial for companies that need internationalization, which can further deepen their dynamic ability to create opportunities in overseas markets (Minbaeva, Park, Vertinsky, & Cho, 2018). Thus, due to the benefits of empirical learning of new things, a company that has realized internationalization earlier through joint ventures or investments (Sambharya & Banerji, 2006) is more likely to grow faster than companies that have started later (Sapienza, Autio, George, & Zahra, 2006; Luo, 1997; Merchant & Schendel, 2000). In addition, Daily, Certo, and Dalton (2000), and Zahra and George (2002) stated that the international experience is essential in the selection of CEO successors, while also interacting with a company's globalization to achieve a higher financial performance. Furthermore, the experience of corporate CEOs can play an important role in solving corporate internal problems.

3. Research Framework and Hypothesis

3.1. Research Framework

In this study, the internal factors of an automotive parts cooperative are first validated by the research hypothesis to

determine whether the internal factors of the financial performance of the joint venture affect sales, and whether they are meaningful by hypothesis. Next, the results of the hypothesis test are used to interpret the field-level meaning of the variables by hypothesis and to provide suggestions for increasing the financial performance of the parts cooperation companies (<Figure 2>).

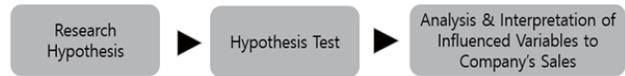


Figure 2 : Research Framework

3.2. Research Hypothesis

In this study, for the research hypothesis that "The internal factors of auto parts suppliers will affect sales as a financial achievement", the independent variables are two internal factors of the parts cooperation companies: assets size, employees, two of the business diversification (number of items delivery, number of suppliers), and one of the overseas market experience-related factors (voice with foreign exchange). This is verified by hypothesis (<Figure 3>).

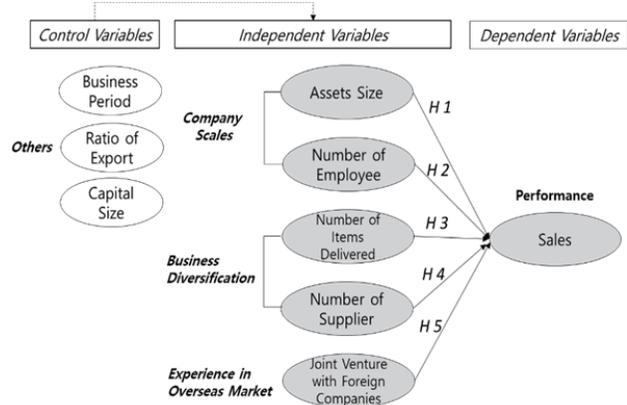


Figure 3: Research Hypothesis

3.2.1. Assets Size and Number of Employee by Company Size

First, in order to survive corporate success and external competition in a market economy, a company must be able to meet the demand for a product or service (Ramjee, 1988). In this study, we look at the size of the company's assets (Ajitabh & Momaya, 2004) and the number of employees as internal factors of the component-partner company. First, Pagano and Schivardi (2003) identify a positive and robust relationship between average size and growth (Acs &

Audrettsch, 1987) in the case of an enterprise's size and growth (Evans, 1987), meaning that "A large firm size has an effect on productivity promotion, which allows it to take advantage of all the increased revenues associated with R&D."

Notwithstanding, Pavitt, Robson, and Townsend (1987) analyzed the relationship between a company's size and innovative activities (Symeonidis, 1996) to have a U-shaped form, in which large companies arise from the development of continuous and suitable technology opportunities in the relevant product market. Therefore, in this study, two research hypotheses were selected: "The assets size(H1) and the number of employees(H2) of a parts cooperation company will have an effect on sales that are financial performance."

H 1: The size of assets by a parts cooperation company will have a positive impact on its sales.

H 2: The number of employees by a parts cooperation company will have a positive impact on its sales.

3.2.2. Number of Items Delivered and Number of Supplier by Business Diversification

In this study, the number of delivery items (H3) and the number of suppliers (H4) were selected as key elements of business diversification. A number of prior studies have been presented on the impact on corporate performance; first, the diversification case studies of Chang and Choi (1988)'s Hyundai Motor Co., Noveoka et al. (2002)'s study of the negative effects of unrelated business diversification on Japan's auto industry, and secondly, McDougal and David (1984)'s study of diversified enterprises and non-multi-faceted enterprises of 108 Australian companies. In addition, Sambharya and Banerji (2006) studied the impact of subcontracting partnerships, interdependencies among car assembly companies and parts suppliers, and the level of globalization on performance, finding that "A greater dependence of part-partner companies on car assembly companies has a positive effect on performance." Sambharya and Banerji (2006) especially emphasized the importance of cooperation as more than 70% of automobile parts are manufactured by parts suppliers. They also argued that subcontractors may be able to improve their performance when they manage their dependencies with car assembler. However, the benefits of a parts supplier can be reduced labor and overhead costs, specialized manufacturing productivity, reduced bureaucracy, and a size of relatively small scale (Sambharya & Banerji, 2006), which is known to have a defining relationship between the number of suppliers and their performance (Lang & Stulz, 1994).

These findings are consistent with several studies showing a strong relationship between diversification and corporate growth, and also with some studies on relative variability between diversification, profitability and risk. As the results of previous research show, business diversification was included, but in this study, the business diversification was largely divided into product diversification and customer diversification, and two research hypotheses were established as follows: the number of delivery items and the number of suppliers.

H 3: The number of delivery items by a parts cooperation company will have a positive impact on its sales.

H 4: The number of suppliers by a parts cooperation company will have a positive impact on its sales.

3.2.3. Joint Venture(J/V) with Foreign Companies by Experience in Overseas Markets

In general, foreign joint ventures are more easily exposed to overseas market experiences than non-joint ventures. Chung and Alcacer (2002) have stated that the ability to utilize external knowledge is also important for companies to diversify their businesses. On the relationship between the success of foreign joint ventures and the strategic and organizational characteristics of local partners, Luo (1997) maintains that "Companies that want to expand their local markets should partner with companies with rich market experience, good market position, high absorption capacity, product differentiation, and those that seek profitability and stability should partner with those with superior international experience, long organizational cooperation and greater market power." Likewise, Sambharya and Banerji (2006) asserted that "Suppliers with international positions benefit more than those who do not." Minbaeva et al. (2018) also stated that "In order for foreign joint ventures to achieve effective knowledge acquisition from overseas partners, knowledge sharing with foreign partners must be generous and active." That is, performance is better if material knowledge is transferred between the networked joint ventures (Luo, 2003). They also argued that earnings may improve further through diversification of overseas markets and overseas customers. There are other examples of research such as Merchant and Schendel (2000) and so forth. In this study, a research hypothesis was established that "A foreign joint venture(H5) could affect the financial performance of a parts cooperation company."

H 5: The joint venture by a parts cooperation company with a foreign company will have a positive impact on its sales.

3.2.4. Business Period, Ratio of Exports and, Capital by Others

In this study, business period, the proportion of exports, and the capital size were selected as the control variables. Evans (1987), and Loderer and Waelchli (2010) maintain that "Business growth is inversely proportional to the size of the enterprise, and as the age of the enterprise decreases, the more likely a company is to fail (Thornhill & Amit, 2003) and its diversity of business growth and growth to decrease." On the other hand, on a study of the relationship between business period and innovation (Huerger & Jaumandreu, 2004), there was found to be a negative correlation between a company's age and profitability (performance). In another industrialist view, the average life expectancy of a company increases with its work force and better innovative companies continue to survive (Loderer & Waelchli, 2010) and other studies show that corporate growth has a negative relationship with corporate performance(age).

Firstly, regarding corporate exports, Bodnar and Wong (2000) stated that "The larger in scale a company is, the greater its exports are or the more it is qualified as a multinational corporation with high levels of international trade. On the other hand, small and medium-sized enterprises produce non-trade goods or are more import-intensive companies." However, Cavusgil (1984) argued that, "There is no mutual relationship between business size and export activities." Besides the previously mentioned, other studies on export performance (Zou & Stan, 1998; Aaby & Slater, 1989; Yang & Chen, 2012) could be reviewed.

Finally, there is other research regarding 'corporate capital', including Lev, Radhakrishnan, and Zhang (2009)'s which found that, "Investments in organizational capital form a basis for sustainable competitive advantage, and are related to future financial performance", and Hasan and Cheung (2018)'s which studied the link between corporate capital and the corporate life cycle, stating that companies with large capital are likely to be in the growth and maturity stages. In addition, there is Symeonidis (1996)'s study on the capital strength and innovation actions.

4. Research Methodology

4.1. Data

Using data from 'Korea Auto Industries Coop Association' data, the research sample for this experiment was conducted on 43 of 246 parts automotive companies and 200 other companies excluding three car assembly business affiliates (Table 1).

Table 1: Default Statistical Analysis Results for Variables

(Unit: million Korean Won)

Variable	Category (N=200)	Average	Standard Deviation	Minimum	Maximum
Independent Variables	Assets Size	4.97	0.52	3.90	6.64
	Number of Employee	405.07	457.34	23.40	4327.40
	Number of Items Delivered	2.96	1.01	1	6
	Number of Supplier	3.34	1.03	1	7
	Joint Venture with Foreign Companies	0.18	0.38	0	1
Dependent Variables	Sales	5.05	0.53	3.79	6.74
Control Variables	Business Period	39.28	11.86	13	73
	Ratio of Export	0.25	0.24	0	0.86
	Capital Size	3.58	0.59	1.81	5.60

Sources: Korea Auto Industries Coop Association (2018)

4.2 Measurement of variables

4.2.1 Dependent Variable

'Sales' was selected as the dependent variable for the financial performance of an auto parts cooperative company. The sales variables were calculated by applying log values to the average value of total sales for five years from 2013 to 2017.

4.2.2. Independent Variable

Five independent variables for this study were selected: 'assets scale', 'number of employee', 'number of Item delivered', 'number of supplier' and 'joint venture with a foreign company's. Of these, the assets scale and number of employee may be approached in terms of company size; the number of delivery items and the number of suppliers, in terms of business diversification; and the joint venture with foreign companies, in terms of experience in overseas markets. The asset was then calculated by applying a log value to the average value of the five-year total, and the number of employees remained the average value of the five-year total. Using the data listed in the Auto Industry Manual 2017 for delivery items, suppliers, and joint ventures with foreign companies, in the case of joint ventures, joint ventures were calculated as 1 and the non-joint ventures as

0 (Table 2).

Table 2: Operational Definition of Variables

Variable		Operational Definition	Sources
Dependent Variables	Sales	Log value of Revenue Size (average of 5 years)	Korea Auto Industries Coop Association (2013~2017)
Independent Variables	Assets Size	Log value of Asset Size (average of 5 years)	
	Number of Employee	Total number of Employees (average of 5 years)	
	Number of Items Delivered	Number of Delivery Items(2017 base)	
	Number of Suppliers	Number of Suppliers(2017 base)	
	Joint Venture with Foreign Companies	Whether to Collaborate with a Foreign Company (2017 base) (* Joint Venture: 1, Non-cooperative: 0)	
Control Variables	Business Period	Business Period(year) = 2018 – Year of Establishment of each Company	
	Ratio of Export	Percentage of Exports among Manufacturing, Repair, and Export Composition (%)	
	Capital Size	Log value of Capital Size (Average of 5 years)	

4.2.3 Control Variable

In addition to the independent variables, the three factors of control selected in this study were: 'business period', 'ratio of export' and 'capital size'. First, because 'business period' is not an internal component that is arbitrarily controllable by the company, the company was classified as a control variable and the remaining years of each company's establishment were subtracted from 2018. While 'ratio of export' has a partial effect on the performance of the company, it was also classified as a control variable because the company itself is difficult to control and has a large external nature, such as its 'enterprise'. 'export'

was calculated as a percentage of exports made, repaired or exported as quantitative export sizes varied widely from one company to another. In addition, 'capital' was calculated by applying a log value to the average value of the sum of five years, as 'capital' may play a significant role in the efficiency and productivity of the company. The operational definitions of five independent variables, one dependent variable and three control variables are as shown in Table 2.

5. Results

5.1. Correlation Analysis

The correlation was then analyzed to confirm the association of each variable before the multiple regression analysis. As a result of the analysis, capital-asset ($p < .001$), number of capital-employees ($p < .001$), the number of asset-employees ($p < .001$) was relatively high in correlation, and whether the company was a joint venture or not was found to be somewhat correlated with the number of capital, assets and suppliers. However, the report shows that there is no correlation between corporate performance, the proportion of exports and the number of delivered items (Table 3).

5.2. Multi Regression Analysis

The study hypothesis of this study is verified by multiple regression analysis using STATA 13.0 (Table 4). First, the VIF (Variance Inflation Factor) verification was carried out to check if there were problems with multicollinearity and heteroscedasticity among the independent variables used in this study. Generally, a VIF value equal to or less than 10 between regression variables indicates an absence of a multicollinearity problem. As a result of the verification, the VIF maximum value for the variables was 2.87 and the minimum value was 1.04, resulting in a VIF average of 1.52, which does not exceed 10 (Table 5). Therefore, it was found that there were no multicollinearity problems (Kennedy, 2003).

Table 3: Correlation Analysis between Variables

Variables	Mean	SD	①	②	③	④	⑤	⑥	⑦	⑧
① Business Period	39.275	11.861	1.000							
② Ratio of Export	0.253	0.237	-.053	1.000						
③ Capital Size	3.584	0.595	.134*	.095	1.000					
④ Assets Size	4.971	0.519	.148**	.135*	.644***	1.000				
⑤ Number of Employee	405.07	457.35	.177**	.102	.527***	.747***	1.000			
⑥ Number of Items Delivered	2.96	1.012	.078	-.076	-.022	-.024	.019	1.000		
⑦ Number of Suppliers	3.34	1.029	.071	.028	.051	.066	.098	.187**	1.000	
⑧ Joint Venture with Foreign Companies	0.175	0.381	-.073	.101	.119*	.154**	.092	-.034	.142**	1.000

* $p < .05$, ** $p < .01$, *** $p < .001$, N=200

Table 4: Summary of Multiple Regression Analysis Models

Model	Model Summary								
	R	R ²	Adjusted R ²	SS	df	MS	F	Root MSE	Durbin-Watson
1	0.624	0.389	0.380	21.54	3	7.18	41.58	0.42	2.04
2	0.947	0.897	0.893	49.69	8	6.21	208.57	0.17	2.18

Model 1: Apply only Control Variables/ Model 2: Full Application with Control Variables

Table 5: Multiple Regression Analysis Results

Model		Unstandardized Coefficients		Standardized Coefficients	Partial Correlation	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta				Tolerance	VIF
1	Business Period	0.00	0.00	0.04	0.05	0.74	0.46	0.98	1.02
	Ratio of Export	-0.02	0.12	-0.01	-0.01	-0.14	0.89	0.99	1.01
	Capital Size	0.55	0.05	0.62	0.61	10.90	0.00	0.97	1.03
2	Business Period	-0.00	0.00	-0.02	-0.06	-0.87	0.38	0.95	1.06
	Ratio of Export	-0.19	0.05	-0.09	-0.26	-3.66	0.00	0.97	1.04
	Capital Size	0.02	0.03	0.02	0.05	0.74	0.46	0.58	1.73
	Assets Size	0.86	0.04	0.85	0.84	21.62	0.00	0.35	2.87
	Number of Employee	0.00	0.00	0.11	0.22	3.13	0.00	0.43	2.32
	Number of Items Delivered	-0.01	0.01	-0.01	-0.03	-0.44	0.66	0.95	1.05
	Number of Suppliers	-0.01	0.01	-0.02	-0.07	-0.96	0.34	0.93	1.07
Joint Venture with Foreign Companies	0.08	0.03	0.06	0.18	2.49	0.01	0.94	1.07	

* Model 1: Apply only Control Variables, ** Model 2: Full Application with Control Variables

* p<.05, **p<.01, ***p<.001

In addition, as a result of BP (Breusch-Pagen) test, the p-value was 0.10 and the white test also accepted the null hypothesis that the p-value was 0.14 as well. Accordingly, it was confirmed that multicollinearity and heteroscedasticity are not present in the basic statistics of this study. Next, the multiple regression analysis was analyzed by dividing the control variables into Model 1 and Model 2, including the independent variables, except for the five independent variables. As a result of the analysis, the coefficient of determination (R^2) of the regression model was 0.624 and 0.380. On the contrary, with a multiple correlation coefficient of 0.947 and a coefficient of determination (R^2) of the regression model of 0.893 (Table 4), Model 2 was found to be more suitable for analytical verification. In addition, the Durbin-Watson values for the two models were 2.04, 2.18, which were unproblematic in the residual independence test of the data. In general, a Durbin-Watson value closer to zero in the range from 0 to 4 shows a positive correlation, whereas a value approaching 4 entails a negative correlation.

In addition, the closer the median value of 2, the more likely there is a correlation between the residuals and the more reasonable the regression analysis is. First, in Model 1, the 'capital size' of parts cooperation company was found to have a positive impact on sales. However, 'business period' and 'export weight' did not have any impact on sales. This finding contradicts previous research that suggests there is a negative relationship between a company's age and its innovation potential and growth, and performance (Huergo

& Jaumandreu, 2004; Evans, 1987; Loderer & Waelchli, 2010; Jovanovic, 1982). The reason for this is presumed to have been due to generational, national or industrial characteristics, given that the research target was limited to Korea's parts cooperation company. Next, Model 2, which includes three control variables in an independent variable, showed that all of the remaining independent variables, except 'number of items delivered' ($t=-0.44$, $p=0.66$) and 'number of suppliers' ($t=-0.96$, $p=0.34$), affect sales (Table 5).

5.3. Hypothesis Test Results

First, it has been adopted that the size of an 'assets scale' of a parts cooperation company will have a positive impact on its sales ($\beta=.85$, $t=21.62$, $p=.000$). This means that the larger the 'assets scale', the more it contributes to improving sales. In the case of Hypothesis 2, the adoption of 'the number of employees' of a parts cooperation company will have a positive impact on its sales" ($\beta=.11$, $t=3.13$ and $p=.002$), which is an 'Economic of scale' phenomenon, where production increases with a large number of employees. In addition, Hypothesis 5, that "the joint venture of a parts cooperation company with a foreign company" will have a positive impact on its sales" was adopted due to there being a positive impact on sales ($\beta=.06$, $t=2.49$ and $p=.014$) resulting from a joint venture between parts cooperation company and a foreign company. However, (H3) 'The number of items delivered' selected as variables for business diversification ($\beta=-.01$, $t=-0.44$, $p=.659$) and (H4) 'The number of Suppliers' ($\beta=-.02$, $t=-0.96$, $p=.336$) was rejected because it did not appear to have a significant impact on sales. The final hypothesis test results are as shown in Table 6.

Table 6: Hypothesis Verification Result

Hypothesis	Contents	Results
H1	The size of the Parts Suppliers' Assets will have a Positive Impact on their Sales.	Accept
H2	The number of Employees of a Parts Cooperation Company will have a Positive Impact on Its Sales.	Accept
H3	The number of Items Delivered by a Parts Cooperation Company will have a Positive Impact on Its Sales.	Reject
H4	The number of Suppliers for Parts Cooperation Company will have a Positive Impact on Their Sales.	Reject
H5	The Joint Venture of a Parts Cooperation Company with a Foreign Company will have a Positive Impact on Its Sales.	Accept

5.4. Meaning and Interpretation of Variables by Hypothesis

5.4.1. Accepted of Hypothesis Variables

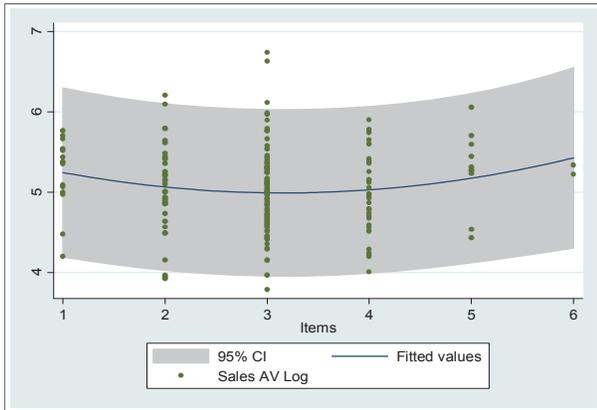
First, in this study, the hypothetical variables 'assets size'(H1), 'number of employees'(H2), and 'joint ventures with foreign companies'(H5) were finally verified to have a positive effect on financial performance. This means that a parts cooperation company must pay more attention to these three things than other internal factors in order to achieve higher financial performance.

In other words, an assets size (H1) refers to a company's tangible and intangible values-generally safe to regard as the company's property. The results of this research show that the greater the tangible and intangible values that a company possesses, the more likely it is to achieve higher financial performance. As a result of this research, the larger the tangible and intangible value held by the company, the more likely it is to achieve higher financial performance. This is understandable when considering the structure of the Korean automotive parts industry. As in <Figure 1>, Korea's automotive production structure embodies a vertical pyramid form, and the closer the car assembly and supply lines, the more complex the process is, forcing parts suppliers to require a higher level of corporate assets. Higher-level parts suppliers will especially have an absolute higher revenue level than lower-level entities. In addition, number of employees (H2) can be interpreted in a similar context, because a company that produces parts with complex processes requires corresponding staff for the tasks of production, management and research. However, it is also true that the more workers a company operates, the more costs this will incur. After all, the size of a company's assets and its number of employees are important to a company's

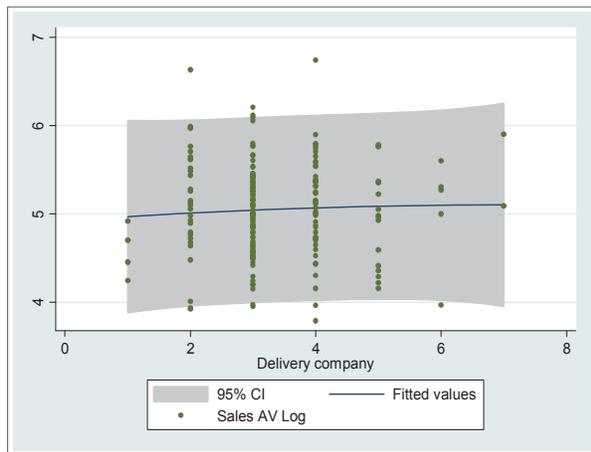
funding ability, and the more financial power the company has, the better its financial performance. Therefore, it is deemed necessary to integrate the 'Economy of scale' effects such as M&A, consortiums and co-branded strategies. Furthermore, while joint ventures with foreign companies(H5) may be interpreted in a similar way as 'assets size', unlike 'assets size' or 'number of employees', it would be reasonable to view the former as an advantage of information communication. In other words, companies that have joint ventures with foreign companies can share a lot of information, including technical know-how, production methods, R&D information, and customer information, as well as market information for their counterpart joint ventures. Therefore, it is assumed that the joint venture with foreign companies positively affects financial performance as many information exchanges were possible for the parts cooperation company in business, sales, production, and research activities.

5.4.2. Reject of Hypothesis Variables

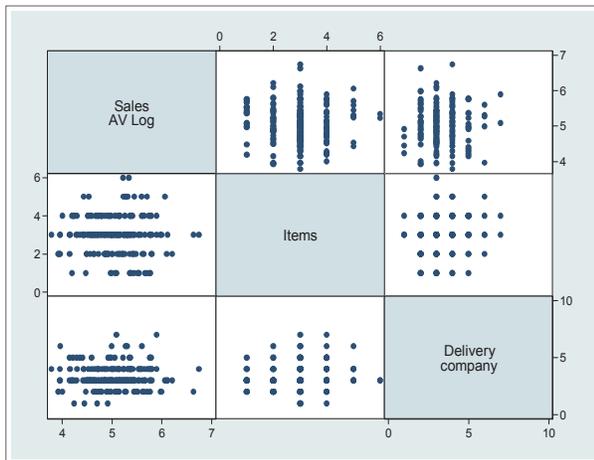
In this study, two hypothesized variables were identified: 'the number of delivery items(H3)' and 'the number of suppliers(H4)'. Two reject variables schematic <Figure 4> (a), (b), a scatterplot of 95% confidence intervals, using 'Gragh Twoway Scatter' to determine what distribution patterns and relationships they have with dependent variables. In addition, a scatterplot (c) was used to predict the relationship between the dependent and the reject variables as well as the relationship between the two reject variables. The scatterplot of the 'number of items delivered' and 'the number of suppliers' showed no unusual correlation between the two independent variables. Also, looking at these reject variables, for starters, the 'number of items delivered(H3)' and sales(a) in <Figure 4> shows that most parts cooperation companies have two to four deliverables, and the relationship to sales is U-shaped. However, companies with one or two delivery items and those with four or five delivery items claimed high overall sales, which reveals that an unconditional large number of delivery items does not mean high sales. Therefore, focusing on a small number of delivery items or diversifying products into four or more delivery items has a more positive impact on sales. Next, looking at the number of suppliers(H4) and the relationship to sales (b), it was found that most parts suppliers had two to four suppliers, and that the relationship with sales was slightly reverse U-shaped. Companies with two to four suppliers had overall higher sales than those with one or more suppliers. This does not mean that a parts cooperation company with many suppliers can lead to more sales; Rather, focusing on a reasonable number of suppliers has had a more positive impact on sales. However, if a single supplier is dependent, additional customer diversification is required. Thus, companies with more than five suppliers should cut one or two suppliers and focus on the remaining suppliers.



(a) The Number of Items Delivered & Sales Relationship



(b) The Number of Suppliers & Sales Relationship



(c) The Number of Items, Suppliers & Sales Relationship Total

* 95% CI: Confidence Interval, ** Sales AV Log: Log Value of Sales Size, *** Items: Number of Delivery items, **** Delivery Company: Number of Suppliers

Figure 4: Relationship between Sales and (a) Items, (b) Delivery Company, (c) Items & Delivery Company

6. Conclusion and Implications

6.1. Conclusion and Implications of the Study

This study is intended to contribute to increasing the financial performance of a parts cooperation company not by examining the relationship between a Korean automobile assembler and a parts cooperation company, but by examining whether the internal factors of a parts cooperation company, affect the financial performance of a parts cooperation company and by interpreting the meaning of each hypothetical variable from a field working-level perspective. In particular, the hypothesis was verified by adding business capital, export share and the number of delivered items, the number of suppliers, and the factors of joint ventures with foreign entities, which were rarely addressed in previous-studies. The research data was used by the KAICA (2018) for 200 companies in the automotive industry manual of Korea from 2013 to 2017. In addition, multiple regression analysis was performed using STATA to verify the research. As a result of the research, in Model 1, which applied only three control variables, there was a positive relationship between the size of the capital and sales of the component cooperative company, whereas business period and the ratio of exports had no significant effect on sales. Next, for Model 2 of the eight variables, including control variables, the size and number of employees and joint ventures with foreign entities of the five independent variables had a positive effect on sales, but the number of other delivery items and suppliers was found to have no significant effect on sales. Of importance is that after interpreting the meaning of each hypothesis variable in terms of field practice, 'Economy of Scale' was found to be significant in increasing financial performance. Consequently, parts cooperation company will need to employ sales growth strategies such as M&A, consortium, Alliance, and co-branding. In addition, based on the result of this study, as it is found that product diversification is realized by focusing on a small number of items or by expanding the number of delivery items to more than four items, and that companies with two to four suppliers also had positive financial performances, it would be recommended to prioritize 'selection and focus' regarding production items and account management.

The significant points of this study are as follows: First, although so far numerous studies of the automotive industry have mainly studied the relationship of car assemblers or car assemblers-parts-partners, this study has attempted to identify how the factors within the parts cooperation companies relate to their financial performance. Second, while research verification methods focuses on analysis based on the hypothesis of adoption, this research, which is specifically intended to present ways to improve the financial performance of a parts cooperation company, certainly does not exclude hypothesis verification and defines and interprets variables from a field level perspective within the rejected and adopted hypotheses. Third, the results of this research may contribute to the

establishment of various mid- and long-term management strategies, including the operation, investment, recruitment of personnel, and joint ventures of foreign companies.

6.2. Limitations and Future Research

Notwithstanding, some limitations of the study have been found. 200 companies were selected for analysis and utilized in KAICA (2018)'s 'Automotive Industry Manual' excluding small businesses that failed to meet the test conditions, which may differ by country, type and size, or by business environment. Therefore, the results of this study may not fully represent Korea's automotive parts cooperation company. Based on the results, it would be recommended to direct future research towards comparative studies of advanced or emerging countries in automotive manufacturing. Second, there are some limitations to detailed analysis, as the financial performance of a parts cooperation company in this study is defined as revenue, but other data, such as net income, is not included. Therefore, additional research on the financial performance factors that may apply additional variables such as gross return on assets or operating profit, as well as revenue as a parts cooperation company's financial performance factor would be of great benefit.

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