



Doosan Infracore Co., Ltd. and Subsidiaries

**Consolidated Financial Statements
December 31, 2019 and 2018**

Doosan Infracore Co., Ltd. and Subsidiaries
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December 31, 2019 and 2018

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Independent Auditor's Report

(English Translation of a Report Originally Issued in Korean)

To the Board of Directors and Shareholders of
Doosan Infracore Co., Ltd.

Opinion

We have audited the accompanying consolidated financial statements of Doosan Infracore Co., Ltd. and its subsidiaries (collectively referred to as the "Group"), which comprise the consolidated statements of financial position as at December 31, 2019 and 2018, and the consolidated statements of profit or loss, and the consolidated statements of comprehensive income, and consolidated statements of changes in equity and consolidated statements of cash flows for the years then ended, and notes to the consolidated financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Group as at December 31, 2019 and 2018, and its consolidated financial performance and its consolidated cash flows for the years then ended in accordance with International Financial Reporting Standards as adopted by the Republic of Korea (Korean IFRS).

Basis for Opinion

We conducted our audits in accordance with Korean Standards on Auditing. Our responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Consolidated Financial Statements* section of our report. We are independent of the Group in accordance with the ethical requirements of the Republic of Korea that are relevant to our audit of the consolidated financial statements and we have fulfilled our other ethical responsibilities in accordance with the ethical requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Key Audit Matters

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the consolidated financial statements of the current period. These matters were addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters.

(1) Revenue recognition – Estimation of liabilities related to revenue deductions

Why it is determined to be a key audit matter

As at December 31, 2019, the Group has recorded ₩ 123,385 million of liabilities related to revenue deductions, including incentives, promotions and rebates. The Group offers customers a variety of incentive and promotion programs. Costs incurred in connection with these programs are recognized as deductions from revenue, and any unsettled amounts are recognized on an accrual basis. Incentive and rebate arrangements are complex, and judgement of management is required in estimating unsettled amounts. Given the extent of complexity and judgement involved, we consider estimation of revenue deductions related to incentives, promotions and rebates recognized as at December 31, 2019 to be a key audit matter (Note 3).

How our audit addressed the key audit matter

We have, utilizing the work of component auditors, performed related audit procedures including the followings. We:

- Assessed appropriateness of the Group's accounting policies for the incentive and promotion programs
- Evaluated design and tested operating effectiveness of related internal controls
- Performed lookback analysis by comparing the estimation of prior year to actual results
- Evaluated appropriateness of methods used by management and whether they have been consistently used
- Tested completeness of sales quantity information subject to revenue deductions programs
- For selected samples, tested accuracy of the inputs and variables used for the management estimates, including sales quantity information, costs incurred, and associated contractual rate

(2) Impairment assessment of goodwill

Why it is determined to be a key audit matter

As at December 31, 2019, the carrying amount of goodwill is ₩ 3,025,412, million, which accounts for 26.7% of the total assets of the Group. The Group performed an impairment assessment on goodwill by using estimated recoverable amount of goodwill allocated to the cash-generating units group (CGU group) and did not recognize goodwill impairment as the recoverable amount of CGU group exceeds its carrying amount. Given the magnitude of goodwill balance in the consolidated financial statements, and the extent of judgement of management estimating in the recoverable amount, we consider impairment assessment of goodwill to be a key audit matter (Note 13).

How our audit addressed the key audit matter

Key audit procedures we have performed in relation to the goodwill impairment assessment are as follows. We:

- Obtained an understanding and evaluated how management assessed goodwill impairment
- Evaluated reasonableness of identifying CGU by management for its assessment of goodwill impairment
- Evaluated accuracy of the market capitalization used to measure the net fair value of the CGU group and examined subsequent changes in the market capitalization after the reporting period
- Evaluated reasonableness of key assumptions used in measurement of the net fair value by comparing them with relevant external information available

(3) Impairment assessment of capitalized development costs

Why it is determined to be a key audit matter

As at December 31, 2019, the carrying amount of development costs capitalized as intangible asset is ₩ 275,254 million. The Group operates several R&D centers in Korea, the United States, Europe and other regions, and invests significant amounts to develop new products and technologies. Given the magnitude of the balance of development costs capitalized in the consolidated financial statements, and the extent of judgement of management required, we consider impairment assessment of capitalized development costs to be a key audit matter (Note 13).

How our audit addressed the key audit matter

Key audit procedures we have performed in relation to the impairment assessment of capitalized development costs. We:

- Obtained the details of capitalized development costs and reconciled the total amount to the amount recorded in the general ledger
- Tested development costs capitalized by examining management's assessment documentation and assessing whether the criteria set out in the relevant accounting standards have been met on a sampling basis
- Obtained an understanding and evaluated the development progress and prospect of the

projects selected as a sample by interviewing with appropriate project manager and performing other procedures, and assessed appropriateness of management's conclusion on impairment analysis

- Examined whether the actual sales have been generated from the projects selected and evaluated reasonableness of sales and profitability forecasts to assess future economic benefits of the projects capitalized

(4) Evaluation of provision for warranty

Why it is determined to be a key audit matter

As at December 31, 2019, the carrying amount of provision for warranty amounts to ₩ 286,469 million. The Group provides product warranties for certain periods after sales of products and recognizes provision for warranty by estimating expected repair expenses. The performance obligation of warranty is determined based on diverse assumptions such as warranty periods, expected warranty expenses such as warranty periods and expected warranty expenses, and the nature and extent of the Group provides. We drew attention to the adequacy of the warranty evaluation considering the fact that the management's estimation is intervened in measuring the provision for warranty (Note 19).

How the matter was addressed in the audit

We performed the following audit procedures in relation to the evaluation of provision for warranty of the Group. We:

- Obtained understanding of accounting policies in recognizing provision for warranty, and understood and evaluated the relevant internal control
- Verified the accuracy of basic information for accounting estimation used by the management
- Compared reasons for the major assumptions, that management used for estimating the relevant liabilities, with the past performance
- Independently recalculated the balance of liabilities as at December 31, 2019

Other Matter

Auditing standards and their application in practice vary among countries. The procedures and practices used in the Republic of Korea to audit such consolidated financial statements may differ from those generally accepted and applied in other countries.

Responsibilities of Management and Those Charged with Governance for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with Korean IFRS, and for such internal control as management determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, management is responsible for assessing the Group's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Group or to cease operations.

Those charged with governance are responsible for overseeing the Group's financial reporting process.

Auditor's Responsibilities for the Audit of the Consolidated Financial Statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Korean Standards on

Auditing will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements.

As part of an audit in accordance with Korean Standards on Auditing, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the Group audit. We remain solely responsible for our audit opinion.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the consolidated financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

The engagement partner on the audit resulting in this independent auditor's report is Yungyung Chang, Certified Public Accountant.

Seoul, Korea
March 16, 2020

This report is effective as of March 16, 2020, the audit report date. Certain subsequent events or circumstances, which may occur between the audit report date and the time of reading this report, could have a material impact on the accompanying consolidated financial statements and notes thereto. Accordingly, the readers of the audit report should understand that there is a possibility that the above audit report may have to be revised to reflect the impact of such subsequent events or circumstances, if any.

Doosan Infracore Co., Ltd. and Subsidiaries
Consolidated Statements of Financial Position
December 31, 2019 and 2018

<i>(in Korean won)</i>	Notes	2019		2018	
Assets					
Current assets					
Cash and cash equivalents	4,10,36	₩	756,173,371,116	₩	1,053,016,029,210
Short-term financial instruments	4,5,10		144,970,645,937		261,439,186,727
Short-term investment securities	4,6,10		9,318,795,000		14,288,402,916
Trade and other receivables	4,7,10		1,369,116,857,182		1,353,418,884,045
Derivative assets	4,9,10		18,988,676,082		8,956,727,423
Inventories	8		1,786,289,860,152		1,524,363,766,335
Other current assets			<u>220,054,157,373</u>		<u>211,338,773,310</u>
			<u>4,304,912,362,842</u>		<u>4,426,821,769,966</u>
Non-current assets					
Long-term financial instruments	4,5,10		880,896,511		848,391,912
Long-term investment securities	4,6,10		14,272,106,397		99,008,790,522
Long-term trade and other receivables	4,7,10		3,801,609,182		10,891,458,308
Non-current derivative financial assets	4,9,10		-		7,996,253,597
Investments in associates and joint ventures	11		102,979,090,904		67,912,129,252
Property, plant and equipment	12		1,871,456,154,884		1,782,632,844,011
Intangible assets	13		4,562,367,986,165		4,328,656,381,720
Investment properties	14		138,829,679,310		26,308,106,687
Deferred tax assets	30		174,235,049,341		205,848,185,403
Right-of-use assets	15,37		95,677,455,743		-
Other non-current assets	4,10		<u>69,180,589,842</u>		<u>72,242,380,666</u>
			<u>7,033,680,618,279</u>		<u>6,602,344,922,078</u>
Total assets		₩	<u>11,338,592,981,121</u>	₩	<u>11,029,166,692,044</u>
Liabilities					
Current liabilities					
Trade and other payables	4,10,16	₩	1,599,449,470,221	₩	1,613,823,764,093
Short-term borrowings	4,10,17,36		591,083,320,796		937,599,855,700
Current portion of bonds	4,10,17,36		1,037,594,646,618		505,338,874,285
Current portion of long-term borrowings	4,10,17,36		621,375,844,987		173,048,137,404
Current tax liabilities	30		30,414,605,601		25,849,607,446
Derivative liabilities	9,10		492,095,603		12,301,480,333
Provisions	19		236,982,347,908		179,066,431,365
Current lease liabilities	4,10,15,37		28,225,777,667		-
Other current liabilities	10		<u>338,801,722,238</u>		<u>331,546,013,747</u>
			<u>4,484,419,831,639</u>		<u>3,778,574,164,373</u>
Non-current liabilities					
Other non-current payables	10,16		1,370,355,771		1,156,747,007
Bonds	4,10,17,36		902,476,286,676		944,061,136,540
Long-term borrowings	4,10,17,36		751,008,617,154		1,708,761,427,603
Net defined benefit liabilities	18		429,338,000,825		406,106,460,314
Non-current derivative liabilities	9,10		1,974,340,123		4,127,632,054
Deferred tax liabilities	30		260,072,401,549		204,364,376,024
Non-current provisions	19		52,254,778,188		20,377,900,315
Non-current lease liabilities	4,10,15,37		51,179,799,272		-
Other non-current liabilities			<u>136,946,531,665</u>		<u>140,821,964,241</u>
			<u>2,586,621,111,223</u>		<u>3,429,777,644,098</u>
Total liabilities			<u>7,071,040,942,862</u>		<u>7,208,351,808,471</u>
Equity					
Share capital	1,20		1,040,806,395,000		1,040,790,385,000
Capital surplus	20		154,356,219,760		213,014,383,085
Other components of equity	21		(70,649,474,593)		(129,310,962,134)
Accumulated other comprehensive income	22		(159,818,151,453)		(256,805,144,728)
Retained earnings	23		<u>1,257,868,188,737</u>		<u>1,049,189,116,801</u>
Equity attributable to owners of the Parent Company			<u>2,222,563,177,451</u>		<u>1,916,877,778,024</u>
Non-controlling interest			<u>2,044,988,860,808</u>		<u>1,903,937,105,549</u>
Total equity			<u>4,267,552,038,259</u>		<u>3,820,814,883,573</u>
Total liabilities and equity		₩	<u>11,338,592,981,121</u>	₩	<u>11,029,166,692,044</u>

The above consolidated statements of financial position should be read in conjunction with the accompanying notes.

Doosan Infracore Co., Ltd. and Subsidiaries
Consolidated Statements of Profit or Loss
Years Ended December 31, 2019 and 2018

<i>(in Korean won)</i>	Notes	2019		2018	
Revenue	24,25	₩	8,185,839,945,377	₩	7,730,107,942,853
Cost of sales	26		<u>(6,273,218,676,924)</u>		<u>(5,936,246,301,169)</u>
Gross profit			1,912,621,268,453		1,793,861,641,684
Selling and administrative expenses	26,27		<u>(1,072,224,207,963)</u>		<u>(945,734,195,514)</u>
Operating profit			840,397,060,490		848,127,446,170
Finance income	28		150,590,559,071		104,252,463,898
Finance costs	28		(330,376,100,312)		(303,338,799,287)
Other non-operating income	29		13,936,345,577		36,084,086,449
Other non-operating expenses	29		(63,836,570,629)		(63,697,135,116)
Loss on equity method	11		<u>(7,702,168,374)</u>		<u>(5,001,734,320)</u>
Profit before income tax			603,009,125,823		616,426,327,794
Income tax expense	30		<u>(207,310,954,827)</u>		<u>(222,256,598,381)</u>
Profit for the year		₩	<u>395,698,170,996</u>	₩	<u>394,169,729,413</u>
Profit is attributable to:					
Owners of the Parent Company		₩	239,913,446,929	₩	246,409,919,128
Non-controlling interest			155,784,724,067		147,759,810,285
Earnings per share					
attributable to the equity holders of the Parent Company	31				
Basic earnings per share		₩	1,153	₩	1,184
Diluted earnings per share			1,139		1,115

The above consolidated statements of profit or loss should be read in conjunction with the accompanying notes.

Doosan Infracore Co., Ltd. and Subsidiaries
Consolidated Statements of Comprehensive Income
Years Ended December 31, 2019 and 2018

<i>(in Korean won)</i>	Notes	2019	2018
Profit for the year		₩ 395,698,170,996	₩ 394,169,729,413
Other comprehensive income			
<i>Items that will not be reclassified to profit or loss</i>			
Remeasurements of net defined benefit liability	18	(41,849,401,252)	37,545,492,014
Revaluation reserves of property, plant and equipment	12	33,791,953,262	3,000,935,957
Gain on valuation of equity instruments at fair value through other comprehensive income		(2,369,093,630)	311,745,173
Share of other comprehensive income of associates	11	1,737,603,778	-
Share of retained earnings of associates	11	(183,785,886)	(109,506,066)
<i>Items that may be subsequently reclassified to profit or loss</i>			
Exchange differences		112,466,225,181	129,649,536,168
Cash flow hedges	9	1,406,355,621	2,510,805,778
Other comprehensive income for the year, net of tax		104,999,857,074	172,909,009,024
Total comprehensive income for the year		₩ 500,698,028,070	₩ 567,078,738,437
Total comprehensive income for the year is attributable to:			
Owners of the Parent Company		305,666,065,211	342,631,656,647
Non-controlling interest		195,031,962,859	224,447,081,790
		₩ 500,698,028,070	₩ 567,078,738,437

The above consolidated statements of comprehensive income should be read in conjunction with the accompanying notes.

Doosan Infracore Co., Ltd. and Subsidiaries
Consolidated Statements of Changes in Equity
Years Ended December 31, 2019 and 2018

(in Korean won)

		Attributable to owners of the Parent Company								
		Share capital	Capital surplus	Other components of equity	Accumulated other comprehensive income	Retained Earnings	Subtotal	Non-controlling Interest	Total	
Balance at January 1, 2018	Notes	W 1,040,000,595,000	W 211,545,565,029	W (108,457,073,777)	W (334,050,917,882)	W 784,702,285,730	W 1,593,740,454,100	W 1,579,421,175,054	W 3,173,161,629,154	
Changes in accounting policy		-	-	-	-	(899,052,422)	(899,052,422)	(372,370,064)	(1,271,422,486)	
Balance after changes		<u>1,040,000,595,000</u>	<u>211,545,565,029</u>	<u>(108,457,073,777)</u>	<u>(334,050,917,882)</u>	<u>783,803,233,308</u>	<u>1,592,841,401,678</u>	<u>1,579,048,804,990</u>	<u>3,171,890,206,668</u>	
Total comprehensive income (loss):										
Profit for the year		-	-	-	-	246,409,919,128	246,409,919,128	147,759,810,285	394,169,729,413	
Remeasurement of net defined benefit liabilities	18	-	-	-	-	13,693,307,289	13,693,307,289	23,852,184,725	37,545,492,014	
Revaluation reserves of property, plant and equipment	12	-	-	-	(2,371,378,063)	5,372,314,020	3,000,935,957	-	3,000,935,957	
Gain on valuation of financial assets at fair value through other comprehensive income		-	-	-	296,376,151	15,369,022	311,745,173	-	311,745,173	
Share of retained earnings of associates	11	-	-	-	-	(105,025,966)	(105,025,966)	(4,480,100)	(109,506,066)	
Exchange differences		-	-	-	79,549,916,777	-	79,549,916,777	50,099,619,391	129,649,536,168	
Cash flow hedges	9	-	-	-	(229,141,711)	-	(229,141,711)	2,739,947,489	2,510,805,778	
Total comprehensive income for the period		-	-	-	<u>77,245,773,154</u>	<u>265,385,883,493</u>	<u>342,631,656,647</u>	<u>224,447,081,790</u>	<u>567,078,738,437</u>	
Transactions with owners										
Cancellation of share options		-	1,117,895,000	(1,117,895,000)	-	-	-	-	-	
Exercise of stock warrants		789,790,000	350,923,056	-	-	-	1,140,713,056	-	1,140,713,056	
Dividend of subsidiary		-	-	-	-	-	-	(53,727,499,200)	(53,727,499,200)	
Disposal of subsidiary shares		-	-	(19,735,993,357)	-	-	(19,735,993,357)	154,168,717,969	134,432,724,612	
Total transactions with owners		<u>789,790,000</u>	<u>1,468,818,056</u>	<u>(20,853,888,357)</u>	<u>-</u>	<u>-</u>	<u>(18,595,280,301)</u>	<u>100,441,218,769</u>	<u>81,845,938,468</u>	
Balance at December 31, 2018		<u>W 1,040,790,385,000</u>	<u>W 213,014,383,085</u>	<u>W (129,310,962,134)</u>	<u>W (256,805,144,728)</u>	<u>W 1,049,189,116,801</u>	<u>W 1,916,877,778,024</u>	<u>W 1,903,937,105,549</u>	<u>W 3,820,814,883,573</u>	
Balance at January 1, 2019		W 1,040,790,385,000	W 213,014,383,085	W (129,310,962,134)	W (256,805,144,728)	W 1,049,189,116,801	W 1,916,877,778,024	W 1,903,937,105,549	W 3,820,814,883,573	
Total comprehensive income (loss):										
Profit for the year		-	-	-	-	239,913,446,929	239,913,446,929	155,784,724,067	395,698,170,996	
Remeasurement of net defined benefit liabilities	18	-	-	-	-	(31,295,789,705)	(31,295,789,705)	(10,553,611,547)	(41,849,401,252)	
Revaluation reserves of property, plant and equipment	12	-	-	-	31,876,521,385	60,968,141	31,937,489,526	1,854,463,736	33,791,953,262	
Gain on valuation of financial assets at fair value through other comprehensive income		-	-	-	(2,540,552,371)	171,458,741	(2,369,093,630)	-	(2,369,093,630)	
Share of other comprehensive income of associates	11	-	-	-	1,614,767,527	-	1,614,767,527	122,836,251	1,737,603,778	
Share of retained earnings of associates	11	-	-	-	-	(171,012,170)	(171,012,170)	(12,773,716)	(183,785,886)	
Exchange differences		-	-	-	61,553,072,511	-	61,553,072,511	50,913,152,670	112,466,225,181	
Cash flow hedges	9	-	-	-	4,483,184,223	-	4,483,184,223	(3,076,828,602)	1,406,355,621	
Total comprehensive income for the period		-	-	-	<u>96,986,993,275</u>	<u>208,679,071,936</u>	<u>305,666,065,211</u>	<u>195,031,962,859</u>	<u>500,698,028,070</u>	
Transactions with owners										
Cancellation of share options	21	-	243,505,810	(243,505,810)	-	-	-	-	-	
Exercise of stock warrants	20	16,010,000	3,324,216	-	-	-	19,334,216	-	19,334,216	
Dividend of subsidiary		-	-	-	-	-	-	(53,980,207,600)	(53,980,207,600)	
Reclassification of other components of equity	21	-	(58,904,993,351)	58,904,993,351	-	-	-	-	-	
Total transactions with owners		<u>16,010,000</u>	<u>(58,658,163,325)</u>	<u>58,661,487,541</u>	<u>-</u>	<u>-</u>	<u>19,334,216</u>	<u>(53,980,207,600)</u>	<u>(53,960,873,384)</u>	
Balance at December 31, 2019		<u>W 1,040,806,395,000</u>	<u>W 154,356,219,760</u>	<u>W (70,649,474,593)</u>	<u>W (159,818,151,453)</u>	<u>W 1,257,868,188,737</u>	<u>W 2,222,563,177,451</u>	<u>W 2,044,988,860,808</u>	<u>W 4,267,552,038,259</u>	

The above consolidated statements of changes in equity should be read in conjunction with the accompanying notes.

Doosan Infracore Co., Ltd. and Subsidiaries
Consolidated Statements of Cash Flows
Years Ended December 31, 2019 and 2018

<i>(in Korean won)</i>	Note	2019	2018
Cash flows from operating activities			
Cash generated from operations:	36		
Profit for the year		₩ 395,698,170,996	₩ 394,169,729,413
Adjustments		699,544,598,699	731,167,416,259
Changes in operating assets and liabilities		(279,345,395,612)	(82,048,871,379)
Interest received		15,548,783,391	15,117,484,431
Interest paid		(152,315,252,013)	(166,701,900,364)
Dividends received		12,982,337,562	4,265,837,456
Income tax paid		<u>(124,694,966,717)</u>	<u>(58,191,953,508)</u>
Net cash inflow from operating activities		<u>567,418,276,306</u>	<u>837,777,742,308</u>
Cash flows from investing activities			
Decrease in short-term financial instruments		116,468,540,790	-
Disposal of short-term investment securities		4,229,388,547	22,809,378,447
Disposal of long-term investment securities		89,098,064,562	229,129,080
Decrease in loans		214,655,657	525,036,293
Disposal of property, plant and equipment		40,704,138,031	25,288,647,854
Disposal of intangible assets		2,661,894,631	242,643,718
Disposal of investments in associates		-	36,424,000,000
Increase in short-term financial instruments		-	(101,272,254,333)
Acquisition of long-term investment securities		(5,373,856,271)	(3,393,765,000)
Increase in loans		-	(393,666,636)
Acquisition of property, plant and equipment		(266,697,358,416)	(150,822,172,341)
Acquisition of intangible assets		(182,781,856,741)	(109,604,453,424)
Acquisition of investment properties		(89,941,811,010)	-
Acquisition of investment in associates		(41,386,826,160)	(18,059,850,000)
Others		<u>(6,569,781,464)</u>	<u>(14,820,807,038)</u>
Net cash outflow from investing activities		<u>(339,374,807,844)</u>	<u>(312,848,133,380)</u>
Cash flows from financing activities			
Proceeds from borrowings		11,656,500,000	637,834,889,738
Proceeds from issuance of bonds		954,050,856,272	283,474,563,443
Changes in Subsidiary Equity		-	140,764,800,002
Repayment of borrowings		(941,445,938,332)	(909,251,648,286)
Repayment of bonds		(498,648,637,732)	(521,653,462,500)
Payments for lease liabilities		(21,423,052,313)	-
Dividends paid		<u>(53,980,207,600)</u>	<u>(53,727,499,200)</u>
Net cash outflow from financing activities		<u>(549,790,479,705)</u>	<u>(422,558,356,803)</u>
Effects of exchange rate changes on cash and cash equivalents		24,904,353,149	7,163,635,831
Net decrease in cash and cash equivalents		(296,842,658,094)	109,534,887,956
Cash and cash equivalents at the beginning of the year		<u>1,053,016,029,210</u>	<u>943,481,141,254</u>
Cash and cash equivalents at the end of the year		<u>₩ 756,173,371,116</u>	<u>₩ 1,053,016,029,210</u>

The above consolidated statements of cash flows should be read in conjunction with the accompanying notes.

Doosan Infracore Co., Ltd. and Subsidiaries

Notes to the Consolidated Financial Statements

December 31, 2019 and 2018

1. General Information

(1) The Parent Company

Doosan Infracore Co., Ltd. (the Parent Company) was incorporated on October 23, 2000, through a spin-off from Daewoo Heavy Industries Ltd. ("DHI") under the corporate restructuring agreement dated January 20, 2000, between DHI and its creditors, and approved by DHI's shareholders on June 27, 2000. The Parent Company operates and manages manufacturing and selling businesses of industrial machinery and equipment.

The spin-off of the Parent Company was done by acquiring assets and assuming liabilities of machinery business sector of DHI as at September 30, 2000, amounting to ₩ 2,494 billion and ₩ 2,806 billion, respectively. Accordingly, DHI's shareholders became shareholders of the Parent Company, the newly established company.

On February 2, 2001, the Parent Company listed its stock on the Korea Exchange, and changed its name to Doosan Infracore Co., Ltd. from Daewoo Heavy Industries & Machinery Ltd. on April 29, 2005. The Parent Company's common stock as at December 31, 2019, amount to ₩ 1,040,806 million, of which 36.27% is owned by Doosan Heavy Industries and Construction Co., Ltd.

(2) Consolidated Subsidiaries

1) The Parent Company's consolidated subsidiaries as at December 31, 2019 and 2018, are as follows:

Subsidiary	Main business	Location	Ownership interest held by the Group ¹ (%)		Ownership interest held by non-controlling interests ¹ (%)		Fiscal year end
			2019	2018	2019	2018	
Doosan Infracore China Co., Ltd.	Manufacturing and Sales	China	80.00	80.00	20.00	20.00	December 31
Doosan Infracore (China) Investment Co., Ltd.	Holdings	China	100.00	100.00	-	-	December 31
Doosan Infracore North America LLC.	Sales	USA	100.00	100.00	-	-	December 31
Doosan Infracore Japan Corp.	Purchases	Japan	100.00	100.00	-	-	December 31
Doosan (China) Financial Leasing Corp.	Finance	China	100.00	100.00	7.80	7.80	December 31
Doosan Bobcat Chile S.A.	Sales	Chile	100.00	100.00	-	-	December 31
Doosan Infracore (Shandong) Co., Ltd.	Sales	China	100.00	100.00	13.00	13.00	December 31
Doosan Infracore Norway AS.	Manufacturing and Sales	Norway	100.00	100.00	-	-	December 31
Doosan Infracore South America Industria E Comercio De Maquinas De Construc�ao LTDA	Sales	Brazil	99.99	99.99	0.01	0.01	December 31
Doosan Infracore Construction Equipment India Private Ltd.	Sales	India	100.00	100.00	-	-	March 31
D20 Capital, LLC ³	Finance investment Software	USA	100.00	-	-	-	December 31
Clue Insight Inc	Development and Sales	USA	71.98	-	28.02	-	December 31
Doosan Infracore Europe B.V	Sales	Netherlands	100.00	100.00	-	-	December 31
Doosan Infracore Czech Republic s.r.o	Sales	Czech	100.00	-	-	-	December 31
D20 CAPITAL FUND I, L.P. ²	Finance investment	USA	-	-	-	-	December 31
Doosan Bobcat Co., Ltd.	Holdings	Korea	51.05	51.05	48.95	48.95	December 31
Doosan Bobcat Global Collaboration Center, Inc	Other Service	USA	100.00	-	48.95	-	December 31
Doosan Bobcat Singapore Pte. Ltd	Holdings	Singapore	100.00	100.00	48.95	48.95	December 31
Doosan Bobcat Korea Co., Ltd.	Sales	Korea	100.00	100.00	48.95	48.95	December 31
Doosan Bobcat Chile Compact SpA	Sales	Chile	100.00	100.00	48.95	48.95	December 31
Doosan Bobcat India Private Ltd.	Manufacturing and Sales	India	100.00	100.00	48.95	48.95	March 31
Bobcat Corp.	Sales	Japan	100.00	100.00	48.95	48.95	December 31
Doosan Bobcat Mexico S.A. de C.V.	Other Service	Mexico	100.00	100.00	48.95	48.95	December 31
Doosan Bobcat China Co., Ltd.	Manufacturing and Sales	China	100.00	100.00	48.95	48.95	December 31
Clark Equipment Co.	Manufacturing and Sales	USA	100.00	100.00	48.95	48.95	December 31
Bobcat Equipment Ltd.	Sales	Canada	100.00	100.00	48.95	48.95	December 31

Doosan Infracore Co., Ltd. and Subsidiaries

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Doosan International Australia Pty Ltd.	Sales	Australia	100.00	100.00	48.95	48.95	December 31
Bobcat Bensheim GmbH.	Sales	Germany	100.00	100.00	48.95	48.95	December 31
Doosan Holdings France S.A.S. ⁴	Holdings	France	100.00	100.00	48.95	48.95	December 31
CJSC Doosan International Russia	Sales	Russia	100.00	100.00	48.95	48.95	December 31
Doosan International UK Ltd.	Sales	England	100.00	100.00	48.95	48.95	December 31
Doosan International South Africa Pty Ltd.	Sales	South Africa	100.00	100.00	48.95	48.95	December 31
Doosan Bobcat EMEA s.r.o. ⁴	Manufacturing and Sales	Czech	100.00	100.00	48.95	48.95	December 31
Bobcat France S.A.	Manufacturing	France	100.00	100.00	48.95	48.95	December 31
Geith International Ltd.	Sales	Ireland	100.00	100.00	48.95	48.95	December 31

¹ The 'ownership interests held by the Group' refers to the simply aggregated portion of ownership interests directly held by the Parent Company and its consolidated subsidiaries. The 'ownership interests held by non-controlling interests' refers to the portion of ownership interests that are not attributable to the owners of the Parent Company, directly or indirectly. The 'ownership interests held by non-controlling interests' may differ from the portion of interests calculated by subtracting aggregated total portion of interests directly held by the entities within the Group from 100% (In other words, it is calculated by subtracting the effective ownership interest held by the entities within the Group from 100%).

² There are no shares owned by the Group, but the overall strength of the activities involved, the degree of exposure to variable profits and the ability to use force to influence the variable profits of the Group, etc. With that in mind, we have determined that the group has control

³ For the year ended December 31, 2019, Doosan Ventures, LLC changed its name to D20 Capital and LLC.

⁴ For the year ended December 31, 2018, Bobcat Lyon SAS was merged into Doosan Holding France S.A.S. and Doosan Holdings Europe Ltd. was merged into Doosan Bobcat EMEA s.r.o

2) Summarized financial information for major consolidated subsidiaries as at and for the year ended December 31, 2019 is as follows:

(in millions of Korean won)

	Assets	Liabilities	Sales	Profit for the year	Total comprehensive income
Doosan Infracore China Co., Ltd.	₩ 1,334,444	₩ 762,003	₩ 1,315,098	₩ 112,883	₩ 112,883
Doosan Infracore (China) Investment Co., Ltd.	221,149	5,449	11,674	1,690	1,690
Doosan Infracore North America LLC	310,758	231,261	267,184	14,686	12,045
Doosan (China) Financial Leasing Corp.	647,985	451,728	60,723	21,824	21,824
Doosan Infracore Europe B.V.	284,038	273,958	553,556	4,175	4,161
Doosan Bobcat Inc. and its subsidiaries	6,704,236	2,725,170	4,509,550	272,116	218,514

3) Financial information for subsidiaries attributable to significant non-controlling interests as at and for the year ended December 31, 2019, is as follows:

(in millions of Korean won)

	Net income allocated to non-controlling interests	Cumulative non-controlling interests	Dividends allocated to non-controlling interests
Doosan Infracore China Co., Ltd.	₩ 22,577	₩ 113,561	₩ -
Doosan Bobcat Inc. and its subsidiaries	133,203	1,947,791	53,980

Doosan Infracore Co., Ltd. and Subsidiaries
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(3) Changes in the Scope of Consolidation

1) Changes in the scope of consolidation for the year ended December 31, 2019, are as follows:

Subsidiary	Description	Reason
Doosan International Luxemburg S.a r.l.	Excluded from consolidation	Liquidation
Doosan Techno Holding Co., Ltd.	Excluded from consolidation	Liquidation
Doosan Infracore Europe S.A.	Excluded from consolidation	Liquidation
Doosan Benelux SA.	Excluded from consolidation	Liquidation
D20 Capital, LLC	Newly included in consolidation	New establishment corporation
Doosan Bobcat Global Collaboration Center, Inc.	Newly included in consolidation	New establishment corporation
Clue Insight Inc.	Newly included in consolidation	New establishment corporation
Doosan Infracore Czech Republic s.r.o.	Newly included in consolidation	New establishment corporation
D20 CAPITAL FUND I, L.P.	Newly included in consolidation	New establishment corporation

2) Changes in the scope of consolidation for the year ended December 31, 2018, are as follows:

Subsidiary	Description	Reason
Doosan Holdings Europe Ltd.	Excluded from consolidation	Merger
KSD 1st Co.,Ltd.	Newly included in consolidation	New agreement
Doosan Infracore Bobcat Ireland Ltd.	Excluded from consolidation	Liquidation
Doosan International Italia S.r.L	Excluded from consolidation	Liquidation
KSD 1st Co.,Ltd.	Excluded from consolidation	Termination of agreement
Bobcat Lyon SAS	Excluded from consolidation	Merger

Doosan Infracore Co., Ltd. and Subsidiaries

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2. Significant Accounting Policies

2.1 Basis of Preparation

The Group maintains its accounting records in Korean won and prepares statutory financial statements in the Korean language (Hangul) in accordance with International Financial Reporting Standards as adopted by the Republic of Korea (Korean IFRS). The accompanying consolidated financial statements have been condensed, restructured and translated into English from the Korean language financial statements.

Certain information attached to the Korean language financial statements, but not required for a fair presentation of the Group's financial position, financial performance or cash flows, is not presented in the accompanying consolidated financial statements.

The consolidated financial statements of the Group have been prepared in accordance with Korean IFRS. These are the standards, subsequent amendments and related interpretations issued by the International Accounting Standards Board (IASB) that have been adopted by the Republic of Korea.

The preparation of financial statements requires the use of critical accounting estimates. Management also needs to exercise judgement in applying the Group's accounting policies. The areas involving a higher degree of judgment or complexity, or areas where assumptions and estimates are significant to the consolidated financial statements are disclosed in Note 3.

(1) New and amended standards and interpretations adopted by the Group

The Group has applied the following standards and amendments for the first time for their annual reporting period commencing January 1, 2019.

- Enactment of Korean IFRS 1116 Leases

Korean IFRS 1116 Leases replaces Korean IFRS 1017 Leases. Under the new standard, with implementation of a single lease model, lessee is required to recognize assets and liabilities for all lease which lease term is over 12 months and underlying assets are not low value assets. A lessee is required to recognize a right-of-use asset and a lease liability representing its obligation to make lease payments.

With implementation of Korean IFRS 1116 *Lease*, the Group has changed accounting policy. The Group has adopted Korean IFRS 1116 retrospectively, as permitted under the specific transitional provisions in the standard, and recognized the cumulative impact of initially applying the standard as at January 1, 2019, the date of initial application. The Group has not restated comparatives for the 2018 reporting period. The impact of the adoption of the leasing standard and the new accounting policies are disclosed in Note 37.

- Amendment to Korean IFRS 1109 Financial Instruments – Prepayment Features with Negative Compensation

The narrow-scope amendments made to Korean IFRS 1109 *Financial Instruments* enable entities to measure certain prepayable financial assets with negative compensation at amortized cost. When a modification of a financial liability measured at amortized cost that does not result in the derecognition, a modification gain or loss shall be recognized in profit or loss. The amendment does not have a significant impact on the financial statements

Doosan Infracore Co., Ltd. and Subsidiaries

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- Amendments to Korean IFRS 1019 *Employee Benefits – Amendment, Curtailment or Settlement of the Plan*

The amendments require that an entity shall calculate current service cost and net interest for the remainder of the reporting period after a plan amendment, curtailment or settlement based on updated actuarial assumptions from the date of the change. The amendments also require that a reduction in a surplus must be recognized in profit or loss even if that surplus was not previously recognized because of the impact of the asset ceiling. The amendment does not have a significant impact on the financial statements.

- Amendments to Korean IFRS 1028 *Investments in Associates and Joint Ventures – Long-term Interests in Associates and Joint Ventures*

The amendments clarify that an entity shall apply Korean IFRS 1109 to financial instruments in an associate or joint venture to which the equity method is not applied. These include long-term interests that, in substance, form part of the entity's net investment in an associate or joint venture. The amendment does not have a significant impact on the financial statements.

- Enactment to Interpretation of Korean IFRS 2123 *Uncertainty over Income Tax Treatments*

The interpretation explains how to recognize and measure deferred and current income tax assets and liabilities where there is uncertainty over a tax treatment, and includes guidance on how to determine whether each uncertain tax treatment is considered separately or together. It also presents examples of circumstances where a judgement or estimate is required to be reassessed. The enactment does not have a significant impact on the financial statements.

Annual Improvements to Korean IFRS 2015 – 2017 Cycle:

- Amendments to Korean IFRS 1103 *Business Combination*

The amendments clarify that when a party to a joint arrangement obtains control of a business that is a joint operation, and had rights to the assets and obligations for the liabilities relating to that joint operation immediately before the acquisition date, the transaction is a business combination achieved in stages. In such cases, the acquirer shall remeasure its entire previously held interest in the joint operation. The amendment does not have a significant impact on the financial statements.

-Amendments to Korean IFRS 1111 *Joint Agreements*

The amendments clarify that when a party that participates in, but does not have joint control of, a joint operation might obtain joint control of the joint operation in which the activity of the joint operation constitutes a business. In such cases, previously held interests in the joint operation are not remeasured. The amendment does not have a significant impact on the financial statements

- Amendments to Paragraph 57A of Korean IFRS 1012 *Income Tax*

The amendment is applied to all the income tax consequences of dividends and requires an entity to recognize the income tax consequences of dividends in profit or loss, other comprehensive income or equity according to where the entity originally recognized those past transactions or events. The amendment does not have a significant impact on the financial statements.

- Korean IFRS 1023 *Borrowing Costs*

The amendments clarify that if a specific borrowing remains outstanding after the related qualifying asset is ready for its intended use (or sale), it becomes part of general borrowings. The amendment does not have a significant impact on the financial statements.

Doosan Infracore Co., Ltd. and Subsidiaries

Notes to the Consolidated Financial Statements

December 31, 2019 and 2018

(2) New standards and interpretations not yet adopted by the Group

The following new accounting standards and interpretations have been published that are not mandatory for December 31, 2019 reporting periods and have not been early adopted by the Group.

- Amendments to Korean IFRS 1001 *Presentation of Financial Statements* and Korean IFRS 1008 *Accounting Policies, Changes in Accounting Estimates and Errors – Definition of Material*

The amendments clarify the explanation of the definition of material and amended Korean IFRS 1001 and Korean IFRS 1008 in accordance with the clarified definitions. Materiality is assessed by reference to omission or misstatement of material information as well as effects of immaterial information, and to the nature of the users when determining the information to be disclosed by the Group. These amendments should be applied for annual periods beginning on or after January 1, 2020, and earlier application of permitted. The Group does not expect that these amendments have a significant impact on the financial statements.

- Amendments to Korean IFRS 1103 *Business Combination – Definition of a Business*

To consider the integration of the required activities and assets as a business, the amended definition of a business requires an acquisition to include an input and a substantive process that together significantly contribute to the ability to create outputs and excludes economic benefits from the lower costs. An entity can apply a concentration test, an optional test, where substantially all of the fair value of gross assets acquired is concentrated in a single asset or a group of similar assets, the assets acquired would not represent a business. These amendments should be applied for annual periods beginning on or after January 1, 2020, and earlier application of permitted. The Group does not expect that these amendments have a significant impact on the financial statements.

2.2 Consolidation

The Group has prepared the consolidated financial statements in accordance with Korean IFRS 1110 *Consolidated Financial Statements*.

(a) Subsidiaries

Subsidiaries are all entities over which the Group has control. The Group controls an entity when the Group is exposed to, or has rights to, variable returns from its involvement with the entity and has the ability to affect those returns through its power to direct the activities of the entity. Subsidiaries are fully consolidated from the date on which control is transferred to the Group. They are deconsolidated from the date that control ceases.

Subsidiaries are fully consolidated from the date on which control is transferred to the Group. They are deconsolidated from the date that control ceases.

The acquisition method of accounting is used to account for business combinations by the Group. The consideration transferred is measured at the fair values of the assets transferred, and identifiable assets acquired and liabilities and contingent liabilities assumed in a business combination are measured initially at their fair values at the acquisition date. The Group recognizes any non-controlling interest in the acquired entity on an acquisition-by-acquisition basis either at fair value or at the non-controlling interest's proportionate share of the acquired entity's net identifiable assets. All other non-controlling interests are measured at fair values, unless otherwise required by other standards. Acquisition-related costs are expensed as incurred.

The excess of consideration transferred, amount of any non-controlling interest in the acquired entity and acquisition-date fair value of any previous equity interest in the acquired entity over the fair value of the net identifiable assets acquired is recorded as goodwill. If those amounts are less than the fair value of the net identifiable assets of the business acquired, the difference is recognized directly in the profit or loss as a bargain purchase.

Doosan Infracore Co., Ltd. and Subsidiaries

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Intercompany transactions, balances and unrealized gains on transactions between group companies are eliminated. Unrealized losses are also eliminated unless the transaction provides evidence of an impairment of the transferred asset. Accounting policies of subsidiaries have been changed where necessary to ensure consistency with the policies adopted by the Group.

The Group treats transactions with non-controlling interests that do not result in a loss of control as transactions with equity owners of the Group. A change in ownership interest results in an adjustment between the carrying amounts of the controlling and non-controlling interest to reflect their relative interest in the subsidiary. Any difference between the amount of the adjustment to non-controlling interest and any consideration paid or received is recognized in a separate reserve within equity attributable to owners of the Parent Company. When the Group ceases to consolidate for a subsidiary because of a loss of control, any retained interest in the subsidiary is remeasured to its fair value with the change in carrying amount recognized in profit or loss.

(b) Investments in Associates and Joint Ventures

Associates are entities over which the Group has significant influence but not control or joint control, where the Group in general holds 20% or more and 50% or less of the voting rights. Investments in joint ventures are investees sharing control over its economic activities with the Group based on a contractual agreement. The contractually agreed sharing of control of an arrangement only exists when financial and operating policy decisions of the investee require the unanimous consent of the parties sharing control.

Investments in associates and joint ventures (collectively referred to as the "associates, etc.") are accounted for using the equity method of accounting, after initially being recognized at cost. The carrying amount of the investments contains the goodwill identified on initial recognition and is presented at the amount less accumulated impairment losses.

The Group's proportionate interest of the investee's profit or loss and changes in other comprehensive income after the date of acquisition is respectively recognized in the Group's profit or loss and other comprehensive income. Cumulative changes after acquisition are adjusted from the carrying amount of the investment. If the Group's share of losses of the associates, etc. is greater than or equal to the investment in the associate, etc., including other unsecured notes, the Group discontinues to recognize further losses, except where it is obligated or required to be paid on behalf of the associates, etc. If there is an objective evidence of impairment for the investment in the associate, the Group recognizes the difference between the recoverable amount of the associate and its book amount as impairment loss. If an associate uses accounting policies other than those of the Group for like transactions and events in similar circumstances, if necessary, adjustments shall be made to make the associate's accounting policies conform to those of the Group when the associate's financial statements are used by the Group in applying the equity method.

Unrealized gains on transactions between the Group and its associates, etc. are eliminated to the extent of the Group's interest in the associates. If there is an objective evidence of impairment for the investment in the associate, the Group recognizes the difference between the recoverable amount of the associate and its book amount as impairment loss.

Accounting policies of associate, etc. are changed if necessary for consistency with those of the Group.

For overseas investees whose financial statements are prepared in foreign currencies, the equity method is applied to financial statements translated in accordance with the accounting treatments of the translation of the financial statements of overseas subsidiaries. The amount of difference between the translated amount of assets less liabilities and translated amount of equity is recognized as changes in the investee's equity (accumulated other comprehensive income) to the extent equivalent to the Group's interest.

Doosan Infracore Co., Ltd. and Subsidiaries

Notes to the Consolidated Financial Statements

December 31, 2019 and 2018

2.3 Foreign Currency Translation

1) *Functional and presentation currency*

Items included in the financial statements of each of the Group's entities are measured using the currency of the primary economic environment in which each entity operates (the "functional currency"). The consolidated financial statements are presented in Korean won, which is the Parent Company's functional and presentation currency.

2) *Transactions and balances*

Foreign currency transactions are translated into the functional currency using the exchange rates at the dates of the transactions. Foreign exchange gains and losses resulting from the settlement of such transactions and from the translation of monetary assets and liabilities denominated in foreign currencies at year end exchange rates are generally recognized in profit or loss. They are deferred in other comprehensive income if they relate to qualifying cash flow hedges and qualifying effective portion of net investment hedges, or are attributable to monetary part of the net investment in a foreign operation.

Foreign exchange gains and losses that relate to borrowings are presented in the statement of comprehensive income, within finance costs. All other foreign exchange gains and losses are presented in the statement of comprehensive income within 'other income or other expenses'.

Non-monetary items that are measured at fair value in a foreign currency are translated using the exchange rates at the date when the fair value was determined. Translation differences on assets and liabilities carried at fair value are reported as part of the fair value gain or loss. For example, translation differences on non-monetary assets and liabilities such as equities held at fair value through profit or loss are recognized in profit or loss as part of the fair value gain or loss and translation differences on non-monetary assets such as equities held at fair value through other comprehensive income are recognized in other comprehensive income.

3) *Translation to the presentation currency*

The results and financial position of foreign operations that have a functional currency different from the presentation currency are translated into the presentation currency as follows:

- ① Assets and liabilities for each statement of financial position presented are translated at the closing rate at the end of the reporting period.
- ② Income and expenses for each statement of profit or loss are translated at average exchange rates, unless this average is not reasonable approximation of the cumulative effect of the rates prevailing on the transaction dates, in which case income and expenses are translated at the rates on the dates of the transactions.
- ③ All resulting exchange differences are recognized in other comprehensive income.

Exchange differences from the net investment in the foreign operation and from borrowings and other foreign currency instruments designated as hedging instrument for such investment are recognized in other comprehensive income. On disposal of part or all foreign operation, which leads to the loss of control, all of the accumulated exchange differences in respect of that operation are reclassified to profit or loss. Goodwill and fair value adjustments arising from the acquisition of a foreign operation are recognized as assets and liabilities of the foreign operation and translated at the closing exchange rate.

Doosan Infracore Co., Ltd. and Subsidiaries

Notes to the Consolidated Financial Statements

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2.4 Cash and Cash Equivalents

Cash and cash equivalents include cash on hand, bank deposits, and other short-term highly liquid investments that are readily convertible to a known amount of cash. Bank overdraft is classified as short-term borrowings in the consolidated statements of financial position.

2.5 Financial Assets

1) Classification

The Group classifies its financial assets in the following measurement categories:

- those to be measured at fair value through profit or loss
- those to be measured at fair value through other comprehensive income, and
- those to be measured at amortized cost.

The classification depends on the Group's business model for managing the financial assets and the contractual terms of the cash flows. For financial assets measured at fair value, gains and losses will either be recorded in profit or loss or other comprehensive income. For investments in debt instruments, this will depend on the business model in which the investment is held. The Group reclassifies debt investments when, and only when its business model for managing those assets changes.

For investments in equity instruments that are not held for trading, this will depend on whether the Group has made an irrevocable election at the time of initial recognition to account for the equity investment at fair value through other comprehensive income. The changes of fair value of equity investments that are not designated under the fair value option are recorded through profit or loss.

2) Recognition and Measurement

At initial recognition, the Group measures a financial asset at its fair value plus, in the case of a financial asset not at fair value through profit or loss, transaction costs that are directly attributable to the acquisition of the financial asset. Transaction costs of financial assets carried at fair value through profit or loss are expensed in profit or loss. Financial assets with embedded derivatives are considered in their entirety when determining whether their cash flows are solely payment of principal and interest.

① Debt instruments

Subsequent measurement of debt instruments depends on the Group's business model for managing the asset and the cash flow characteristics of the asset. The Group classifies its debt instruments into one of the following three measurement categories.

(a) Amortized cost

Assets that are held for collection of contractual cash flows where those cash flows represent solely payments of principal and interest are measured at amortized cost. A gain or loss on a debt investment that is subsequently measured at amortized cost and is not part of a hedging relationship is recognized in profit or loss when the asset is derecognized or impaired. Interest income from these financial assets is included in 'finance income' using the effective interest rate method.

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(b) Fair value through other comprehensive income

Assets that are held for collection of contractual cash flows and for selling the financial assets, where the assets' cash flows represent solely payments of principal and interest, are measured at fair value through other comprehensive income. Movements in the carrying amount are taken through other comprehensive income, except for the recognition of impairment loss (reversal of impairment loss), interest income and foreign exchange gains and losses which are recognized in profit or loss. When the financial asset is derecognized, the cumulative gain or loss previously recognized in other comprehensive income is reclassified from equity to profit or loss. Interest income from these financial assets is included in 'finance income' using the effective interest rate method. Foreign exchange gains and losses are presented in 'financial income or expenses' and impairment losses are presented in 'other expenses'.

(c) Fair value through profit or loss

Assets that do not meet the criteria for amortized cost or fair value through other comprehensive income are measured at fair value through profit or loss. A gain or loss on a debt investment that is subsequently measured at fair value through profit or loss and is not part of a hedging relationship is recognized in profit or loss and presented net in the statement of profit or loss within 'other income or expenses' in the year in which it arises.

② *Equity instruments*

The Group subsequently measures all equity investments at fair value. Where the Group's management has elected to present fair value gains and losses on equity investments, which held for long-term investment or strategic purpose, in other comprehensive income, there is no subsequent reclassification of fair value gains and losses to profit or loss following the derecognition of the investment. Dividend income from such investments continue to be recognized in profit or loss as 'finance income' when the right to receive payments is established.

Changes in the fair value of financial assets at fair value through profit or loss are recognized in 'other income and expenses' in the statement of profit or loss as applicable. Impairment loss (reversal of impairment loss) on equity investments measured at fair value through other comprehensive income are not reported separately from other changes in fair value.

3) *Impairment*

The Group assesses on a forward looking basis the expected credit losses associated with its debt instruments carried at amortized cost and fair value through other comprehensive income. The impairment methodology applied depends on whether there has been a significant increase in credit risk. For trade receivables and lease receivables, the Group applies the simplified approach, which requires expected lifetime credit losses to be recognized from initial recognition of the receivables.

4) *Derecognition*

If a transfer does not result in derecognition because the Group has retained substantially all the risks and rewards of ownership of the transferred asset, the Group continues to recognize the transferred asset in its entirety and recognizes a financial liability for the consideration received. The Group classified the financial liability as "borrowings" in the statement of financial position.

5) *Offsetting of financial instruments*

Financial assets and liabilities are offset and the net amount reported in the statements of financial position where there is a legally enforceable right to offset the recognized amounts and there is an intention to settle on a net basis or realize the assets and settle the liability simultaneously.

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2.6 Financial Liabilities

1) *Classification and measurement*

The Group's financial liabilities at fair value through profit or loss are financial instruments held for trading. A financial liability is held for trading if it is incurred principally for the purpose of repurchasing in the near term. A derivative that is not a designated as hedging instruments and an embedded derivative that is separated are also classified as other financial liabilities.

The Group classifies non-derivative financial liabilities, except for financial liabilities at fair value through profit or loss, financial guarantee contracts and financial liabilities that arise when a transfer of financial assets does not qualify for derecognition, as financial liabilities carried at amortized cost and present as 'Trade and other payables', and 'borrowings' in the statement of financial position.

2) *Derecognition*

Financial liabilities are removed from the statement of financial position when it is extinguished; for example, when the obligation specified in the contract is discharged or cancelled or expired or when the terms of an existing financial liability are substantially modified. The difference between the carrying amount of a financial liability extinguished or transferred to another party and the consideration paid (including any non-cash assets transferred or liabilities assumed) is recognized in profit or loss.

3) *Financial guarantee contract liabilities*

Financial guarantee contracts are contracts that require the issuer to make specified payments to reimburse the holder for a loss incurred because a specified debtor fails to make payments when due in accordance with the terms of debt instruments.

Financial guarantee contract liabilities are initially measured at their fair values and, if not designated as at fair value through profit or loss, are subsequently measured at the higher of:

- ① the amount determined in accordance with the expected credit loss model under Korean IFRS 1109 Financial Instruments and
- ② the amount initially recognized less, where appropriate, the cumulative amount of income recognized in accordance with Korean IFRS 1115 *Revenue from Contracts with Customers*

2.7 Compound Financial Instruments

The liability component and equity component of compound financial instruments issued by the Group are separately classified based on the substance of the contractual terms. The compound financial instruments issued by the Group are classified and presented separately as the financial liability component and equity conversion option which can be converted into equity instruments at the option of the holder. The liability component of the compound instruments is recognized initially at the fair value of a similar bond that does not have an equity conversion option, and subsequently recognized at amortized cost by applying the effective interest rate until extinguished on conversion or maturity of the bonds. The equity component is determined by deducting the amount of the liability component from the fair value of the compound instrument as a whole. This is recognized and included in equity, net of income tax effects, and is not subsequently remeasured. If it is classified not as equity component but as derivatives, it is regarded as embedded derivatives estimated at the fair value of the same derivatives or calculated from a reasonable valuation model. The subsequent gains or losses arising from its fair value fluctuation are recognized in profit or loss.

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2.8 Trade Receivables

Trade receivables are amounts owed by customer for products and services provided in the ordinary course of business. Receivables expected to be collected within one year are classified as current assets. Otherwise, they are classified as non-current assets. Trade receivables are initially measured at fair value and are presented as net of allowance for doubtful accounts, estimated on an individual basis based on past bad debt experience.

2.9 Inventories

Inventories are stated at the lower of cost or net realizable value. Cost of inventories includes fixed and variable manufacturing overheads allocated to inventories by the most appropriate method of each category. The cost of inventories is determined by the gross average method (the specific identification method for materials in transit). And during the year, perpetual inventory systems are used to value inventories, which are adjusted to physical inventory counts performed at the end of the year.

The Group periodically reviews changes in net realizable value of inventories (current replacement cost for raw materials) due to damage, obsolescence, decline in selling prices and others and recognizes loss on inventory valuation. Loss on inventory valuation is charged to cost of sales when it is ordinary and to other non-operating expense when it is extraordinary. When the previous circumstances that caused the loss on inventory valuation no longer exist and the new market value of inventories subsequently exceeds the carrying amount, the valuation loss is reversed to the extent not exceeding the initial carrying amount, and the reversal is deducted from cost of sales.

2.10 Property, Plant and Equipment

Property, plant and equipment are stated at cost, less subsequent accumulated depreciation and accumulated impairment losses except for lands to which the revaluation model is applied. When useful life of a certain part of property, plant and equipment is different compared to that of the whole asset, such part is recognized as a separate asset. The historical cost includes expenditure that is directly attributable to the acquisition of the item, including estimated costs of dismantling, removing or restoring the assets at the end of the expected useful life.

Subsequent costs, incurred to replace a part of previously recognized item of property, plant and equipment, are added to the carrying amount of an asset, or recognized as a separate asset, if it is probable that future economic benefits associated with the assets will flow into the Group and the cost of an asset can be measured reliably. In such cases, the carrying amount of what was replaced is derecognized accordingly. Routine maintenance and repairs are expensed as incurred through profit or loss.

Depreciation of all property, plant and equipment, except for land, is calculated using the straight-line method, which reflects the best estimate of the expected consumption pattern of future economic benefits inherent in the asset, to allocate their cost, net of their residual values.

The Group depreciates property, plant and equipment with a limited useful life over the following periods:

	<u>Estimated useful life (years)</u>
Buildings	20 – 40
Structures	10 – 20
Machinery	3 – 15
Vehicles	3 – 10
Tools	3 – 10
Office equipment	3 – 14

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If a part of a property, plant and equipment has a cost that is significant in relation to the total cost of property, plant and equipment, it is depreciated separately.

The Group reviews the depreciation method, the estimated useful lives and residual values of property, plant and equipment at the end of each annual reporting period. If expectations differ from previous estimates, the changes are accounted for as a change in an accounting estimate.

When the carrying amount of property, plant and equipment is higher than the recoverable amount, the carrying amount is adjusted to the recoverable amount and the difference is recognized as an impairment loss. Meanwhile, when the recoverable amount subsequently exceeds the carrying amount of the impaired asset, the excess is recorded as a reversal of impairment loss to the extent that the reversed asset does not exceed the carrying amount before the previous impairment, as adjusted by depreciation. Upon derecognition of a property, plant and equipment, the difference between the net disposal amount and carrying amount of the item is recognized as other non-operating income or expense.

2.11 Intangible Assets

Intangible assets are initially measured at cost and are carried at cost, less accumulated amortization and accumulated impairment losses. Subsequent expenditure on an intangible asset is capitalized only when it is probable that the expected future economic benefits that are attributable to the asset will increase.

Intangible assets, except for goodwill and those with indefinite useful lives, are amortized using the straight-line method with no residual value, with amortization beginning when the asset is available for use, over their estimated useful lives as follows. However, Membership rights that have an indefinite useful life are not subject to amortization because there is no foreseeable limit to the period over which the assets are expected to be utilized. Instead of being amortized they are tested for impairment in each reporting period.

	<u>Estimated useful life (years)</u>
Industrial rights	5 – 10
Development costs	3 – 12
Other intangible assets	3 – 7

Goodwill acquired through business combinations refers to the consideration paid in excess of the fair value of the Group's share of the identifiable net assets of the subsidiary on the date of acquisition. Goodwill recognized from the acquisition of certain subsidiary, is classified as intangible assets. Goodwill is tested for impairment annually and carried at the historical cost at the date of business acquisition, less accumulated impairment losses. Impairment loss recognized for goodwill is not reversed. For the purpose of impairment testing, goodwill is allocated to each of the Group's cash-generating units (or groups of cash-generating units) that is expected to benefit from the synergies of the combination.

Expenditures relating to development activities are capitalized when the results of development plan were for new product developments or substantial improvement of functions of existing products, there is technical and commercial feasibility of completing the development and the Group has the ability to measure the expenditures attributable to the development with reliability. Capitalized development costs include expenditure on materials, salaries and related overhead cost that is reasonably allocated. Capitalized development costs are presented at the acquisition cost, less accumulated amortization and accumulated impairment losses. Capitalized development costs are amortized using the straight-line method over the estimated useful life and amortization expenses are included in cost of goods and selling and administrative expenses. The expenditure on research and development, which does not meet conditions noted above, is expensed through profit or loss when it is incurred.

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The estimated useful life and amortization method for intangible assets with finite useful lives are reviewed at the end of each reporting period. For intangible assets with indefinite useful life, assessment is revisited each period, with the effect of any changes in estimate being accounted for as a change in accounting estimate.

2.12 Investment Property

Investment property is property held to earn rentals or for capital appreciation or both. An investment property is measured initially at its cost, including transaction cost incurred in acquiring the asset. An investment property is measured after initial measurement at depreciated cost (less any accumulated impairment losses). After recognition as an asset, investment property is carried at cost less accumulated depreciation and impairment losses. The Group depreciates investment properties, except for land, using the straight-line method over their useful lives of 40 years.

The estimated useful lives, residual values and depreciation method are reviewed at the end of each reporting period, with the effect of any changes in estimate being accounted for as a change in accounting estimate.

2.13 Borrowing Costs

Borrowing costs that are directly attributable to the acquisition, construction or production of a qualifying asset are capitalized during the period of time that is required to complete and prepare the asset for its intended use. Other borrowing costs are expensed in the period in which they are incurred.

2.14 Impairment of Non-financial Assets

Goodwill and intangible assets that have an indefinite useful life are not subject to amortization and are tested annually for impairment. Other assets are tested for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognized for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs of disposal and value in use. For the purposes of impairment test, assets are grouped at the lowest levels which separately generates identifiable cash flows(cash-generating units). Non-financial assets other than goodwill that suffered an impairment are reviewed for possible reversal of the impairment at the end of each reporting period.

2.15 Trade and Other Payables

These amounts represent liabilities for goods and services provided to the Group prior to the end of reporting period which are unpaid. Trade and other payables are presented as current liabilities, unless payment is not due within 12 months after the reporting period. They are recognized initially at their fair value and subsequently measured at amortized cost using the effective interest method.

2.16 Borrowings

Borrowings are measured initially at fair value, net of transaction costs and subsequently at amortized cost using the effective interest method, with interest expense being recognized on an effective yield basis. The difference between the amount received and the redemption amount is amortized using the effective interest method and recognized in profit or loss. Borrowings are classified as non-current liabilities when the Group has an unconditional right to defer settlement of the liability for at least 12 months after the end of the reporting period. Otherwise, borrowings are classified as current liabilities.

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2.17 Post-employment benefits

The Group operates both defined contribution and defined benefit pension plans.

A defined benefit plan is a pension plan that is not a defined contribution plan. Generally, post-employment benefits are payable after the completion of employment, and the benefit amount depended on the employee's age, periods of service or salary levels. The liability recognized in the statement of financial position in respect of defined benefit pension plans is the present value of the defined benefit obligation at the end of the reporting period less the fair value of plan assets. The defined benefit obligation is calculated annually by independent actuaries using the projected unit credit method. The present value of the defined benefit obligation is determined by discounting the estimated future cash outflows using interest rates of high-quality corporate bonds that are denominated in the currency in which the benefits will be paid, and that have terms approximating to the terms of the related obligation. Remeasurement gains and losses arising from experience adjustments and changes in actuarial assumptions are recognized in the period in which they occur, directly in other comprehensive income. Changes in the present value of the defined benefit obligation resulting from plan amendments or curtailments are recognized immediately in profit or loss as past service costs.

Contributions to defined contribution plans are recognized as an expense when employees have rendered service that entitles them to the contributions.

2.18 Provisions and Contingent Liability

Provisions are recognized when 1) the Group has a present obligation (legal or constructive) as a result of a past event, 2) it is probable that the Group will be required to settle the obligation 3) and a reliable estimate can be made for the amount of the obligation. The amount of the provision is measured as present value of the prospective cash flows estimated to settle the present obligation when the difference between the face value and present value is material. At the end of each reporting period, the remaining provision balance is reviewed and assessed to determine whether the current best estimate is being recognized. The increase in provision due to passage of time is recognized as interest expense. If the existence of an obligation to transfer economic benefit is no longer probable, the related provision is reversed during the period. When some or all of the economic benefits required to settle a provision are expected to be recovered from a third party, a receivable is recognized as an asset if it is virtually certain that reimbursement will be received and the amount of the receivable can be measured reliably. In this case, profit from reimbursement is offset against the expense incurred in the recognition of provision through profit or loss.

2.19 Derivative Instruments

Derivatives are initially recognized at fair value on the date when a derivative contract is entered into and are subsequently remeasured at their fair value at the end of each reporting period. Changes in the fair value of any derivative instrument that does not qualify for hedge accounting are recognized immediately in profit or loss.

The effective portion of changes in the fair value of derivatives that are designated and qualify as cash flow hedges is recognized in other comprehensive income. The gain or loss relating to the ineffective portion is recognized immediately in profit or loss.

2.20 Dividend

Dividend payable is recognized as liability when declaration of the dividend is approved at the shareholders' meeting.

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2.21 Share-based Payment Arrangement

The Group recognizes share options granted to employees at the fair value at the grant date. The fair value determined at the grant date of the share option is expensed on a straight-line basis over the vesting period, reflecting the expected rate of the share option's right extinction.

2.22 Revenue Recognition

In accordance with K-IFRS 1115, the Group recognizes revenue from all types of the contracts by using the five-step revenue recognition model. The five-step revenue recognition model is as follows:

- Identify contracts with customers
- Identify the separate performance obligation
- Determine the transaction price of the contract
- Allocate the transaction price to each of the separate performance obligations, and
- Recognize the revenue as each performance obligation is satisfied.

(1) Identify the separate performance obligation

The Group generally separates contracts to recognize revenue from service rendered, apart from sales of goods or products. The Group determines standard warranty coverage periods per product and country considering warranty periods required by law and others when entering into contracts with customers for the sales of products. If the Group provides an extended warranty beyond the standard warranty coverage period or a customer has the option to purchase an additional warranty separately, the warranty is considered as a separate performance obligation when revenue is recognized.

(2) Performance obligation recognized at once

Revenue on sales of goods is recognized when the products have been delivered to the customer. Delivery does not occur until the products have been shipped to the specified location, the risks of obsolescence and loss have been transferred to the customer, and the customer has accepted the products in accordance with the sales contract or the acceptance provisions have lapsed or the Group has objective evidences that all criteria for acceptance have been satisfied.

(3) Sales with a right of return

In accordance with K-IFRS 1115, the Group estimates an amount of variable consideration by using the expected value which the Group expects to better predict the amount of consideration. The Group recognize revenue with transaction price including variable consideration only to the extent that it is highly probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the refund period has lapsed. The refund liability is measured at the amount of consideration received for which the Group does not expect to be entitled.

2.23 Government Grants

For the purpose of acquisition of certain assets, government grants related to assets are accounted for as a deduction from related assets on the date that the related assets are received.

If a government grant that will be received is not subject to specific conditions, government grants related to primary operating activity are recognized in operating income; otherwise, those are recognized in other non-operating income. Meanwhile, for those recognized in the other non-operating income, expenses incurred related to the government grants is to be offset before they are recognized in profit or loss.

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2.24 Current and Deferred Tax

The tax expense for the period consists of current and deferred tax. Current and deferred tax is recognized in profit or loss, except to the extent that it relates to items recognized in other comprehensive income or directly in equity. In this case, the tax is also recognized in other comprehensive income or directly in equity, respectively.

Income tax expense is the sum of corporate tax for each fiscal year and tax added to corporate tax under corporate income tax law and other law, including the amount of income taxes or tax refunds for the prior periods recognized in the current period. The Group's liability for current tax is calculated using tax rates that have been enacted or substantively enacted by the end of the reporting period. Deferred tax is recognized on temporary differences between the carrying amounts of assets and liabilities in the consolidated financial statements and the corresponding tax bases used in the computation of taxable income. However, deferred tax assets and liabilities are not recognized if the temporary difference arises from the initial recognition (other than in a business combination) of other assets and liabilities in a transaction that affects neither the taxable income nor the accounting income.

Deferred tax assets and liabilities are measured at the tax rates that are expected to apply in the period in which the liability is settled or the asset is realized, based on tax rates and tax laws that have been enacted or will substantively be enacted by the end of the reporting period.

The Group recognizes a deferred tax liability all taxable temporary differences associated with investments in subsidiaries, associates, and interests in joint arrangements, except to the extent that the Group is able to control the timing of the reversal of the temporary difference and it is probable that the temporary difference will not reverse in the foreseeable future. In addition, The Group recognizes a deferred tax asset for all deductible temporary differences arising from such investments to the extent that it is probable the temporary difference will reverse in the foreseeable future and taxable profit will be available against which the temporary difference can be utilized.

The carrying amount of deferred tax assets is reviewed at the end of each reporting period and it is reduced to the extent that it is no longer probable that sufficient taxable income will be available to allow all or part of the asset to be recovered.

2.25 Earnings per Share

Basic earnings per common share are computed by dividing net income attributable to owners of the Group by the weighted-average number of common shares outstanding during the period. Diluted earnings per common share are computed by dividing diluted net income attributable to the owners of the Group, which is adjusted by adding back the after-tax amount of expenses related to dilutive potential ordinary shares, by weighted-average number of common shares and dilutive potential ordinary shares outstanding during the period. Anti-dilutive potential ordinary shares are disregarded in the calculation of diluted earnings per share.

2.26 Assets Held for sale

Non-current assets (or disposal group) are classified as held for sale when their carrying amount will be recovered principally through a sale transaction rather than through continuing use and a sale is considered highly probable. The assets are measured at the lower amount between their carrying amount and the fair value less costs to sell.

Non-current assets that are classified either as held for sale or as a part of a disposal group classified as held for sale are not depreciated (or amortized). If the fair value, less costs to sell, of the non-current assets, or disposal groups, held for sale decreases, impairment loss is recognized immediately through profit or loss. When it increases subsequently, the gain is recognized at the amount not exceeding the accumulated impairment loss.

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2.27 Lease

The Group has changed its accounting policy for leases. The impact of the new accounting policies is disclosed in Note 37.

Lessor accounting under Korean IFRS 1116

Lease income from operating leases where the Group is a lessor is recognized in income on a straight-line basis over the lease term. Initial direct costs incurred in obtaining an operating lease are added to the carrying amount of the underlying asset and recognized as expense over the lease term on the same basis as lease income. The respective leased assets are included in the statement of financial position based on their nature. The Group did not need to make any adjustments to the accounting for assets held as lessor as a result of adopting the new leasing standard.

Lessee accounting under Korean IFRS 1116

The Group allocates the consideration in the contract to the lease and non-lease components based on their relative stand-alone prices. However, for leases of real estate for which the Group is lessee, the Group applies the practical expedient which has elected not to separate lease and non-lease components and instead accounts for these as a single lease component.

Lease terms are negotiated on an individual basis and contain a wide range of different terms and conditions. The lease agreements do not impose any covenants, but leased assets may not be used as security for borrowing purposes.

Until the 2018 financial year, leases of property, plant and equipment were classified as operating leases. Payments made under operating leases (net of any incentives received from the lessor) were charged to profit or loss on a straight-line basis over the period of the lease.

From January 1, 2019, leases are recognized as a right-of-use asset and a corresponding liability at the date at which the leased asset is available for use by the Group.

In the case of the Group, the lease period is calculated including a period reasonably convinced that the lease user will not exercise the extension option and a period reasonably convinced that the lease user will not exercise the termination option during the non-disability period within the executable period of the contract. If the lessee and the lessor have the right to terminate without the consent of the other party, the Group shall calculate the enforceable period considering the economic disadvantages to be incurred in terminating the contract.

Assets and liabilities arising from a lease are initially measured on a present value basis. Lease liabilities include the net present value of the following lease payments:

- Fixed payments (including in-substance fixed payments), less any lease incentives receivable
- Variable lease payment that are based on an index or a rate, initially measured using the index or rate as at the commencement date
- Amounts expected to be payable by the Group (the lessee) under residual value guarantees
- The exercise price of a purchase option if the Group (the lessee) is reasonably certain to exercise that option, and
- Payments of penalties for terminating the lease, if the lease term reflects the Group (the lessee) exercising that option

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Also, lease liabilities are measured including lease payments to be paid in accordance with an extension option which is reasonably certain to exercise.

The lease payments are discounted using the interest rate implicit in the lease. If that rate cannot be determined, the lessee's incremental borrowing rate is used, being the rate that the lessee would have to pay to borrow the funds necessary to obtain an asset of similar value in a similar economic environment with similar terms and conditions.

The Group is exposed to potential future increases in variable lease payments based on an index or rate, which are not included in the lease liability until they take effect. When adjustments to lease payments based on an index or rate take effect, the lease liability is reassessed and adjusted against the right-of-use asset.

Each lease payment is allocated between the liability and finance cost. The finance cost is charged to profit or loss over the lease period so as to produce a constant periodic rate of interest on the remaining balance of the liability for each period.

Right-of-use assets are measured at cost comprising the following:

- the amount of the initial measurement of lease liability
- any lease payments made at or before the commencement date less any lease incentives received
- any initial direct costs, and
- restoration costs

The right-of-use asset is depreciated over the shorter of the asset's useful life and the lease term on a straight-line basis. If the Group is reasonably certain to exercise a purchase option, the right-of-use asset is depreciated over the underlying asset's useful life. Although the Group elected to apply the revaluation model to its land and buildings that are presented in property, plant and equipment, the Group elected not to apply that revaluation model to buildings held by the Group that are presented in the right-of-use assets.

Payments associated with short-term leases and leases of low-value assets are recognized on a straight-line basis as an expense in profit or loss.

2.28 Segment Reporting

Information of each operating segment is reported in a manner consistent with the internal business segment reporting provided to the chief operating decision-maker. The chief operating decision-maker is responsible for allocating resources and assessing performance of the operating segments.

2.29 Accounting Treatment Related to the Emission Rights Cap and Trade Scheme

The Group classifies the emission rights as intangible assets. The allowance received free of charge from the government are measured at zero, while those purchased are measured at acquisition cost. Also, if the emission rights granted free of charge by the government in relation to certain implementation year are sufficient to fulfill the obligation under the emission liability of current period, the emission liability is measured as zero. However, if there is a shortage, Emissions obligations are measured as the sum of the carrying amount of the allocated allowances that will be the best estimate of expenditure required to settle the obligation at the end of reporting period for any excess emission.

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2.30 Approval of Issuance of the Financial Statements

The consolidated financial statements 2019 were approved for issue by the Board of Directors on February 10, 2020 and are subject to change with the approval of shareholders at their Annual General Meeting on March 24, 2020.

3. Critical Accounting Estimates and Assumptions

The preparation of the consolidated financial statements requires the Group to make estimates and assumptions concerning the future. Management also needs to exercise judgement in applying the Group's accounting policies. Estimates and assumptions are continually evaluated and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances. As the resulting accounting estimates will, by definition, seldom equal the related actual results, it can contain a significant risk of causing a material adjustment.

The estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are discussed below. Additional information of significant judgement and assumptions of certain items are included in relevant notes.

(1) Provisions for product warranty

The Group provides warranty for products when the related revenue is recognized. At the end of each reporting period, provisions are recorded at the best estimated costs to settle current and future warranty obligations. The Group continuously introduces new products using advanced complex technology, and accordingly, these estimates may change in future due to additional provisions required under local legislation and practice.

(2) Impairment of goodwill

The Group performs test for goodwill impairment testing annually. Recoverable amount of cash-generating units is based on calculation of value in use. The value-in-use calculation requires accounting estimates.

(3) Allowance for doubtful accounts of receivables

In order to calculate the impairment of receivables, the management of the Group estimates an expected bad debt considering the aging of receivables, past experience of bad debt and economic and industrial factors.

(4) Impairment of capitalized development cost

The Group performs an assessment for impairment of capitalized development costs at the end of each reporting period by reviewing project's business forecast, technical feasibility and future economic benefit. The assessment on indication of impairment or calculation of recoverable amount of capitalized development costs involves management's estimates and judgments.

(5) Revenue recognition – Deductions from revenue

The Group offers its customers a variety of promotion and incentive programs and related costs are recognized as deductions from the revenue. Any unsettled amounts are recognized on an accrual basis. These liabilities related to revenue deductions are estimated based on historical experience and judgement of management when the related revenue is recognized. The Group's revenue is affected by these estimated revenue deductions.

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4. Financial Risk Management

The purpose of the Group's financial risk management is to improve financial structure and efficiency of fund management to create stable and sustainable management performance even under various financial risks such as market risk, credit risk and liquidity risk.

Financial risk management activities are mainly managed by the finance department, and, in close cooperation with the relevant departments, the department is engaged in activities such as identification, valuation and hedging of financial risks, and focusing on minimizing the impact of financial risks through regular monitoring.

(1) Market Risk

1) Foreign exchange risk

The Group is exposed to foreign currency risk as it makes international transactions in foreign currencies. Foreign currency risk arises from forecast transactions, recognized assets and liabilities and net investments in foreign operations.

Foreign currency risk is managed by the Group's Regulation on foreign currencies. The Group's basis for foreign currency management is to reduce the volatility of profit or loss. The Group reduces exposure to foreign currency risk by matching the inflow and the outflow of foreign currencies (natural hedge), and manages foreign currency risk by using currency derivatives, such as currency forwards, for the remaining exposures.

The Group's monetary assets and liabilities denominated in foreign currencies and exposed to foreign currency risk as at December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019				
	USD	EUR	CNY	Others ¹	Total
Financial assets	₩ 634,955	₩ 219,002	₩ 123,919	₩ 131,976	₩ 1,109,852
Financial liabilities	(815,871)	(269,320)	(16,424)	(69,247)	(1,170,862)
Net assets (liabilities)	₩ (180,916)	₩ (50,318)	₩ 107,495	₩ 62,729	₩ (61,010)
	2018				
	USD	EUR	CNY	Others ¹	Total
Financial assets	₩ 619,712	₩ 175,157	₩ 129,577	₩ 68,330	₩ 992,776
Financial liabilities	(1,071,849)	(231,222)	(26,993)	(70,916)	(1,400,980)
Net assets (liabilities)	₩ (452,137)	₩ (56,065)	₩ 102,584	₩ (2,586)	₩ (408,204)

¹ Others are assets and liabilities denominated in foreign currencies other than USD, EUR and CNY.

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A sensitivity analysis on the Group's profit before income tax, assuming a 10% increase and decrease in functional currency exchange rates (functional currency per foreign currency) of the respective entity holding the assets and liabilities, for the years ended December 31, 2019 and 2018, is as follows:

	<i>(in millions of Korean won)</i>			
	2019		2018	
	10% increase in foreign exchange currency rate	10% decrease in foreign exchange currency rate	10% increase in foreign exchange currency rate	10% decrease in foreign exchange currency rate
Profit before income tax	₩ (6,101)	₩ 6,101	₩ (40,820)	₩ 40,820

2) Interest rate risk

The Group's interest rate risk is related to borrowings and bank deposits with floating interest rates, and the related interest income and expense are exposed to interest rate risk. Borrowings and bank deposits with fixed interest rates do not have influence on current profit or loss and equity due to the changes in market interest rates.

To manage the Group's interest rate risk in advance, the Group tries to minimize external borrowings by using internal funds, reducing borrowings with high interest rates, improving the structure of long-term and short-term borrowings, maintaining the appropriate balance between borrowings with floating interest rate, and fixed interest rate and regularly monitoring domestic and international interest rate changes with action plans.

Financial instruments with floating interest rates exposed to interest rate risk as for the years ended December 31, 2019 and 2018, is as follows:

	2019		2018	
	Financial assets	₩ 67,876	₩ 57,903	
Financial liabilities	1,041,713	809,474		

The table below summarizes the impact of increases/decreases of interest rate on the Group's profit (loss) before income tax. The analysis is based on the assumption that the interest rate has increased/decreased by 100 basis points with all other variables held constant.

	<i>(in millions of Korean won)</i>			
	2019		2018	
	100 bp increase	100 bp decrease	100 bp increase	100 bp decrease
Income (expense) before income tax expense	₩ (9,738)	₩ 9,738	₩ (7,516)	₩ 7,516

3) Price risk

The Group is exposed to equity securities price risk arises from investments held by the Group that are classified either as at fair value through other comprehensive income or at fair value through profit or loss in the consolidated statement of financial position.

(2) Credit Risk

Credit risk arises during the normal course of transactions and investing activities where customers or other parties are unable to comply with contractual obligations. The Group sets out and monitors credit limits for its customers and counterparts on a periodic basis considering financial conditions, historical experiences and other factors.

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Credit risk arises from cash and cash equivalents, derivatives and deposits with banks and financial institutions, as well as credit exposures to major customers, including receivables and definite term contracts.

Main objectives of credit risk management are to efficiently manage credit risk based on the Group's credit policies, to promptly support decision-making processes and to minimize financial losses through safeguarding receivables. Where default is expected for receivables that represents impairment indicators or are past due at the end of reporting period, the Group assesses related credit risk and reflects it on allowances in its consolidated statement of financial position.

- Exposure to credit risk

Maximum exposures of financial assets of the Group exposed to credit risk as at December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2019		December 31, 2018	
Cash and cash equivalents	₩	756,173	₩	1,053,016
Short-term and long-term financial instrument		145,852		262,288
Trade and other receivables		1,369,117		1,353,419
Long-term trade and other receivables		3,802		10,891
Deposits		42,150		33,626
Derivative assets		18,989		16,953
Short-term and long-term financial instrument (excluding equity securities)		13,374		8,845
Total	₩	2,349,457	₩	2,739,038

Aging analysis of the Group's receivables as at December 31, 2019 and 2018, is as follows:

	December 31, 2019							
	Individually impaired receivables	Receivables assessed for impairment on a collective basis						Total
		Within due	0-3 months	3-6 months	6-12 months	Over 12 months		
Trade receivables	₩ 315,382	₩ 1,139,775	₩ 95,554	₩ 10,467	₩ 5,249	₩ 23,117	₩ 1,589,544	
Other receivables	35,770	60,694	15,752	2,781	305	26,513	141,815	
Accrued income	-	4,974	-	-	-	-	4,974	
Short-term loans	15,113	155	-	-	-	-	15,268	
Long-term trade receivables	-	3,669	-	-	-	-	3,669	
Long-term other receivables	5,703	21	-	-	-	-	5,724	
Long-term loans	-	171	-	-	-	-	171	
Total	₩ 371,968	₩ 1,209,459	₩ 111,306	₩ 13,248	₩ 5,554	₩ 49,630	₩ 1,761,165	
Loss allowance provision for trade receivables	₩ (280,102)	₩ (2,962)	₩ (1,000)	₩ (1,295)	₩ (1,203)	₩ (18,629)	₩ (305,191)	

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December 31, 2018

	Individually impaired receivables	Receivables assessed for impairment on a collective basis					Total
		Within due	0-3 months	3-6 months	6-12 months	Over 12 months	
Trade receivables	₩ 417,644	₩ 1,105,808	₩ 58,048	₩ 8,380	₩ 5,884	₩ 28,633	₩ 1,624,397
Other receivables	39,070	45,930	31,561	12	925	17,838	135,336
Accrued income	-	6,333	-	-	-	-	6,333
Short-term loans	14,841	282	-	-	-	-	15,123
Long-term trade receivables	-	10,998	-	-	-	-	10,998
Long-term other receivables	5,704	96	-	-	-	-	5,800
Long-term loans	-	171	-	-	-	-	171
Total	₩ 477,259	₩ 1,169,618	₩ 89,609	₩ 8,392	₩ 6,809	₩ 46,471	₩ 1,798,158
Loss allowance provision for trade receivables	₩ (325,131)	₩ (4,926)	₩ (913)	₩ (1,064)	₩ (1,333)	₩ (21,176)	₩ (354,543)

Receivables with specific impairment indicators such as insolvency and bankruptcy are individually assessed using appropriate allowance rates. A group of financial assets with similar credit risk natures that are not individually significant is assessed on a collective basis based on aging analysis and the Group's historical experience on collection.

(3) Liquidity Risk

Liquidity risk represents the risk that the Group may encounter difficulties in fulfilling its obligations to repay financial liabilities or in being not able to have additional funding for its normal business operations due to liquidity shortage.

The Group prepares cash flow budgets for a three-month period as well as annual fiscal year to forecast cash flows from operating, investing and financing activities. Through these forecasts, the Group secures and maintains an appropriate level of liquidity volume and accordingly manages liquidity risk in advance.

Details of the Group's liquidity risk analysis as at December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

December 31, 2019

Book amount	Nominal cash flows				
	Total	Less than 1 year	Less than 2 year	Less than 5 year	More than 5 years
Financial liabilities	₩ 5,626,663	₩ 4,018,394	₩ 653,398	₩ 1,116,360	₩ 23,111

(in millions of Korean won)

December 31, 2018

Book amount	Nominal cash flows				
	Total	Less than 1 year	Less than 2 year	Less than 5 year	More than 5 years
Financial liabilities	₩ 5,920,847	₩ 3,401,285	₩ 1,177,870	₩ 755,676	₩ 1,027,405

The amounts of financial liabilities by remaining maturity included in above represent undiscounted contractual nominal cash flows (including interest expenses), assuming the earliest period in which the Group can be required to pay, and therefore differ from the financial liabilities recognized in the consolidated statements of financial position. In addition to the above financial liabilities, the maximum

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amount of the guarantee that can be borne by the Group's financial guarantee contracts as of the end of the reporting period is as follows in note 33.

(4) Capital Risk

The Group's objectives when managing capital are to safeguard the Group's ability to continue as a going concern, so the Group can continue to provide returns for shareholders and benefits for other stakeholders, and to maintain an optimal capital structure to reduce the cost of capital.

In order to maintain or adjust the capital structure, the Group may adjust the amount of dividends paid to shareholders, return capital to shareholders, issue new shares or sell assets to reduce debt. Consistent with others in the industry, the Group monitors capital on the basis of the gearing ratio. This ratio is calculated as net debt divided by total capital.

Gearing ratios as at December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2019		December 31, 2018	
Debt	₩	7,071,041	₩	7,208,352
Equity		4,267,552		3,820,815
Debt-to-equity ratio		<u>165.69%</u>		<u>188.66%</u>

5. Restricted Financial Instruments

Details of restricted financial instruments as at December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2019		December 31, 2018		Description
Short-term financial instruments	₩	73,794	₩	219,974	Win-win Growth Fund Pledged for borrowings and others
Long-term financial instruments		11		11	Bank transaction deposits and others
Total	₩	<u>73,805</u>	₩	<u>219,985</u>	

6. Short-term and Long-term Investment Securities

(1) Short-term and long-term investment securities as at December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	December 31, 2019	
Short-term Investment securities:		
Financial Assets at Amortized Cost	₩	39
Financial assets at fair value through profit or loss		9,280
Subtotal	₩	<u>9,319</u>
Long-term Investment securities:		
Financial Assets at Amortized Cost	₩	1,682
Financial assets at fair value through other comprehensive income		937
Financial assets at fair value through profit or loss		11,653
Subtotal	₩	<u>14,272</u>

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December 31, 2018

Short-term Investment securities:		
Financial Assets at Amortized Cost	₩	1,808
Financial assets at fair value through profit or loss		12,480
Subtotal	₩	<u>14,288</u>
Long-term Investment securities:		
Financial Assets at Amortized Cost	₩	90
Financial assets at fair value through other comprehensive income		91,972
Financial assets at fair value through profit or loss		6,946
Subtotal	₩	<u>99,008</u>

(2) Financial assets at fair value comprise the following investments at December 31, 2019 and 2018:

(in millions of Korean won)

December 31, 2019

Current Financial Assets at Amortized Cost:		
Government bonds and public bonds	₩	39
Debt Securities		-
Subtotal	₩	<u>39</u>
Non-current Financial Assets at Amortized Cost:		
Government bonds and public bonds	₩	82
Debt Securities		1,600
Subtotal	₩	<u>1,682</u>
Non-current Financial assets at fair value through other comprehensive income:		
Investments in non-listed company	₩	937
Equity instruments		-
Subtotal	₩	<u>937</u>
Current Financial assets at fair value through profit or loss:		
Financial assets held for trading	₩	9,280
Non-current Financial assets at fair value through profit or loss:		
Beneficiary certificates	₩	6,343
Investments in funds		5,310
Subtotal	₩	<u>11,653</u>

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December 31, 2018

Current Financial Assets at Amortized Cost:			
Government bonds and public bonds		₩	8
Debt Securities			1,800
	Subtotal	₩	1,808
Non-current Financial Assets at Amortized Cost:			
Government bonds and public bonds		₩	90
Debt Securities			-
	Subtotal	₩	90
Non-current Financial assets at fair value through other comprehensive income:			
Investments in non-listed company		₩	937
Equity instruments			91,035
	Subtotal	₩	91,972
Current Financial assets at fair value through profit or loss:			
Financial assets held for trading		₩	12,480
Non-current Financial assets at fair value through profit or loss:			
Beneficiary certificates		₩	2,252
Investments in funds			4,694
	Subtotal	₩	6,946

(3) Change in financial assets at fair value for the year ended December 31, 2019, is as follows:

(in millions of Korean won)

	2019						
	Beginning balance	Acquisition	Disposal	Valuation	Others	Ending balance	
Financial assets at fair value through other comprehensive income	₩ 91,972	₩ -	₩ (89,098)	₩ (1,937)	₩ -	₩ 937	
Financial assets at fair value through profit or loss	19,427	5,343	-	(3,668)	(169)	20,933	
Total	₩ 111,399	₩ 5,343	₩ (89,098)	₩ (5,605)	₩ (169)	₩ 21,870	

(4) Change in financial assets at fair value for the year ended December 31, 2018, is as follows:

(in millions of Korean won)

	2018						
	Beginning balance	Changes in accounting policy	Acquisition	Disposal	Valuation	Others	Ending balance
Financial assets at fair value through other comprehensive income	₩ -	₩ 88,247	₩ -	₩ (32)	₩ 3,388	₩ 369	₩ 91,972
Financial assets at fair value through profit or loss	-	37,729	3,389	(21,582)	(109)	-	19,427
Total	₩ -	₩ 125,976	₩ 3,389	₩ (21,614)	₩ 3,279	₩ 369	₩ 111,399

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7. Trade and Other Receivables

(1) Trade and other receivables as at December 31, 2019 and 2018, consist of the following:

(in millions of Korean won)

	December 31, 2019		
	Gross amount¹	Provision for impairment	Carrying amount
Current:			
Trade receivables	₩ 1,573,827	₩ (305,191)	₩ 1,268,636
Other receivables	141,815	(46,463)	95,352
Accrued income	4,974	-	4,974
Short-term loans	15,268	(15,113)	155
Total	₩ 1,735,884	₩ (366,767)	₩ 1,369,117
Non-current:			
Long-term trade receivables	₩ 3,610	-	₩ 3,610
Long-term loans	171	-	171
Long-term other receivables	5,724	(5,703)	21
Total	₩ 9,505	₩ (5,703)	₩ 3,802

(in millions of Korean won)

	December 31, 2018		
	Gross amount¹	Provision for impairment	Carrying amount
Current:			
Trade receivables	₩ 1,604,706	₩ (354,543)	₩ 1,250,163
Other receivables	135,336	(38,695)	96,641
Accrued income	6,333	-	6,333
Short-term loans	15,123	(14,841)	282
Total	₩ 1,761,498	₩ (408,079))	₩ 1,353,419
Non-current:			
Long-term trade receivables	₩ 10,679	-	₩ 10,679
Long-term loans	171	-	171
Long-term other receivables	5,495	(5,454)	41
Total	₩ 16,345	₩ (5,454)	₩ 10,891

¹ The Group recognizes the transfer of trade receivable as collateralized borrowing for those that do not meet the requirements for the elimination of financial instruments (Note 17).

(2) Changes in provision for impairment of loans and receivables for the years ended December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019			
	Beginning balance	Provision for (reversal of) allowance	Write off and Others¹	Ending balance
Trade receivables	₩ 354,543	₩ (7,984)	₩ (41,368)	₩ 305,191
Other receivables	38,695	6,911	857	46,463
Short-term loans	14,841	-	272	15,113
Long-term other receivables	5,454	251	(2)	5,703
Total	₩ 413,533	₩ (822)	₩ (40,241)	₩ 372,470

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¹ Includes gain or loss arising from changes in foreign exchange rates.

(in millions of Korean won)

	2018					
	Beginning balance (IAS 39)	Adjustments to retained earnings at beginning ²	Beginning balance after adjustment (IFRS 9)	Provision for (reversal of) allowance	Write off and Others ¹	Ending balance
Trade receivables	₩ 402,432	₩ 1,265	₩ 403,697	₩ 3,514	₩ (52,668)	₩ 354,543
Other receivables	56,873	6	56,879	(1,974)	(16,210)	38,695
Short-term loans	14,922	-	14,922	-	(81)	14,841
Long-term other receivables	5,676	-	5,676	(222)	-	5,454
Total	₩ 479,903	₩ 1,271	₩ 481,174	₩ 1,318	₩ (68,959)	₩ 413,533

¹ Includes gain or loss arising from changes in foreign exchange rates.

² For receivables which the impairment indications are individually identifiable, allowance for doubtful accounts are recognized by the specific identification method. For aggregate receivables, not individually significant but classified by similar nature, the Group applies the simplified approach to measuring expected credit losses which uses a lifetime expected loss allowance. To measure the expected credit losses, trade and other receivables have been grouped based on the shared credit risk characteristics and the days past due. Expected credit losses include forward looking. The provisions for impaired receivables and loans are included in selling and administrative expenses and other non-operating expenses in the consolidated statement of profit or loss.

8. Inventories

Inventories as at December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

	December 31, 2019			December 31, 2018		
	Acquisition cost	Valuation allowance	Carrying amount	Acquisition cost	Valuation allowance	Carrying amount
Merchandise	₩ 321,097	₩ (21,725)	₩ 299,372	₩ 261,845	₩ (20,560)	₩ 241,285
Finished goods	628,442	(31,787)	596,655	550,914	(26,451)	524,463
Semi-finished goods	145,155	(281)	144,874	40,867	(81)	40,786
Work in progress	82,076	-	82,076	59,908	(11)	59,897
Raw materials	500,436	(22,459)	477,977	427,645	(22,413)	405,232
Supplies	1,959	(52)	1,907	2,068	(95)	1,973
Materials in transit	183,429	-	183,429	250,728	-	250,728
Total	₩ 1,862,594	₩ (76,304)	₩ 1,786,290	₩ 1,593,975	₩ (69,611)	₩ 1,524,364

Inventories recognized as cost of sales during the year ended December 31, 2019, amounted to ₩ 5,837,772 million (2018: ₩ 5,545,152 million). Loss on valuation of inventories added to cost of sales amounted to ₩ 6,693 million for the same period (2018: deducted ₩ 3,129 million).

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9. Derivative Instruments

(1) Details of derivative instruments are as follows:

Purpose	Type of derivative instruments	Description
Cash flow hedge	Foreign currency forward	A contract to avoid cash flow risk arising from forecasted sales in foreign currencies
	Foreign currency swap	A contract to pay fixed interest rate in Korean Won and receive fixed interest rate in foreign currency on future interest and principal payment date to avoid the risk of cash flow fluctuations due to exchange rate fluctuations
	Interest rate swap	A contract to pay fixed interest rate in foreign currency and receive variable interest rate (linked to Libor) in foreign currency on future interest payment date to avoid the risk of cash flow fluctuations due to changes in interest rate (Libor) fluctuations
Purpose of sale	Foreign currency forward	Foreign currency forwards to avoid risk of cash flow fluctuations
	Foreign currency swap	Foreign currency swap to avoid risk of cash flow fluctuations

(2) Details of valuation of derivative instruments as at December 31, 2019 and 2018, are as follows:

(in thousands of foreign currencies and millions of Korean won)

	2019									
	Buy		Sell		Derivative assets (liabilities)	Valuation gain (loss)	Other comprehensive income (loss) ¹			
	Currency	Amount	Currency	Amount						
Foreign currency forward	KRW	119,220	USD	100,000	₩	3,551	₩	-	₩	3,551
	KRW	39,699	EUR	30,000		693		-		693
	JPY	1,092,000	KRW	11,793		(157)		-		(157)
	EUR	9,644	GBP	8,423		(335)		-		(148)
		Subtotal			₩	3,752	₩	-	₩	3,939
Foreign currency swap	USD	600,000	KRW	682,312	₩	12,770	₩	-	₩	(1,019)
		Subtotal			₩	12,770	₩	-	₩	(1,019)
		Total			₩	16,522	₩	-	₩	2,920

¹ The amounts are not adjusted for deferred income tax effect.

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	2018									
	Buy		Sell		Derivative assets (liabilities)	Valuation gain (loss)	Other comprehensive income (loss) ¹			
	Currency	Amount	Currency	Amount						
Foreign currency forward	KRW	135,071	USD	120,000	₩	1,127	₩	-	₩	1,127
	JPY	4,056,000	KRW	40,343		1,026		-		1,026
	EUR	12,470	GBP	11,164		127		-		82
		Subtotal			₩	2,280	₩	-	₩	2,235
Foreign currency swap	USD	600,000	KRW	677,910	₩	(14,254)	₩	-	₩	(9,233)
	EUR	85,070	USD	100,000		2,345		6,221		-
		Subtotal			₩	(11,909)	₩	6,221	₩	(9,233)
Interest rate swap	USD	600,000	USD	600,000	₩	10,153	₩	-	₩	4,636
		Subtotal			₩	10,153	₩	-	₩	4,636
	Total			₩	524	₩	6,221	₩	(2,362)	

¹ The amounts are not adjusted for deferred income tax effect.

Derivative instruments are classified as non-current assets (liabilities) if their remaining maturities exceed 12 months from the end of the reporting period; otherwise, they are classified as current assets (liabilities).

Gain or loss relating to the ineffective portion is recognized in profit or loss in applying cash flow hedge.

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10. Financial Instruments by Category

(1) Fair value of financial assets and liabilities by category as at December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

Financial assets	December 31, 2019					
	Financial assets at Amortized Cost	Financial assets at Fair Value through Comprehensive Income	Other Financial assets ¹	Financial assets at Fair value through Profit or Loss	Total	Fair Value
Cash and cash equivalents	₩ 756,173	₩ -	₩ -	₩ -	₩ 756,173	₩ 756,173
Short-term financial instruments	144,971	-	-	-	144,971	144,971
Short-term investment securities	39	-	9,280	-	9,319	9,319
Trade and other receivables	1,356,867	12,250	-	-	1,369,117	1,369,117
Derivative assets	-	-	-	18,989	18,989	18,989
Long-term financial assets	881	-	-	-	881	881
Long-term investment securities	1,682	937	11,653	-	14,272	14,272
Long-term trade and other receivables	3,802	-	-	-	3,802	3,802
Other non-current assets	42,153	-	-	-	42,153	42,153
Total	₩ 2,306,568	₩ 13,187	₩ 20,933	₩ 18,989	₩ 2,359,677	₩ 2,359,677

¹ Other financial assets include derivatives designated as hedging instruments, which are not subject to financial instruments by category.

(in millions of Korean won)

Financial liabilities	December 31, 2019			
	Financial liabilities at Amortized Cost	Other Financial liabilities ¹	Total	Fair Value
Trade and other payables	₩ 1,599,449	₩ -	₩ 1,599,449	₩ 1,599,449
Borrowings and bonds	3,903,539	-	3,903,539	3,903,539
Derivative liabilities	-	2,466	2,466	2,466
Other current liabilities	43,858	-	43,858	43,858
Other non-current liabilities	41,864	-	41,864	41,864
Financial guarantee liabilities	-	2,401	2,401	2,401
Lease liabilities	-	79,406	79,406	79,406
Total	₩ 5,588,710	₩ 84,273	₩ 5,672,983	₩ 5,672,983

¹ Other financial liabilities include derivatives designated as hedging instruments, which are not subject to financial instruments by category, Financial guarantee liabilities and lease liabilities.

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Financial assets	December 31, 2018					
	Financial assets at Amortized Cost	Financial assets at Fair value through Other Comprehensive Income	Financial assets at Fair Value through Profit or Loss	Other Financial assets ¹	Total	Fair value
Cash and cash equivalents	₩ 1,053,016	₩ -	₩ -	₩ -	₩ 1,053,016	₩ 1,053,016
Short-term financial instruments	261,439	-	-	-	261,439	261,439
Short-term investment securities	1,808	-	12,480	-	14,288	14,288
Trade and other receivables	1,315,840	37,579	-	-	1,353,419	1,353,419
Derivative assets	-	-	2,972	13,981	16,953	16,953
Long-term financial assets	848	-	-	-	848	848
Long-term investment securities	91	91,972	6,946	-	99,009	99,009
Long-term trade and other receivables	10,891	-	-	-	10,891	10,891
Other non-current assets	33,627	-	-	-	33,627	33,627
Total	₩ 2,677,560	₩ 129,551	₩ 22,398	₩ 13,981	₩ 2,843,490	₩ 2,843,490

¹ Other financial assets include derivatives designated as hedging instruments, which are not subject to financial instruments by category.

(in millions of Korean won)

Financial liabilities	December 31, 2018				
	Financial liabilities at amortized cost	Financial liabilities at fair value through profit or loss	Other financial liabilities ¹	Total	Fair value
Trade and other payables	₩ 1,613,824	₩ -	₩ -	₩ 1,613,824	₩ 1,613,824
Borrowings and bonds	4,268,809	-	-	4,268,809	4,268,809
Derivative liabilities	-	626	15,803	16,429	16,429
Other current liabilities	37,056	-	-	37,056	37,056
Other non-current liabilities	41,251	-	-	41,251	41,251
Financial guarantee liabilities	-	-	1,820	1,820	1,820
Total	₩ 5,960,940	₩ 626	₩ 17,623	₩ 5,979,189	₩ 5,979,189

¹ Other financial liabilities include derivatives designated as hedging instruments, which are not subject to financial instruments by category, Financial guarantee liabilities and lease liabilities.

(2) Fair value hierarchy classifications of the financial instruments that are measured at fair value as at December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

	December 31, 2019			
	Level 1 ¹	Level 2 ¹	Level 3 ¹	Total
Financial assets at Fair value:				
Financial assets at Fair Value through Other Comprehensive Income	₩ -	₩ 12,250	₩ 937	₩ 13,187
Financial assets at Fair Value through Profit or Loss	9,280	-	11,653	20,933
Other Financial assets	-	18,989	-	18,989
Total	₩ 9,280	₩ 31,239	₩ 12,590	₩ 53,109
Financial liabilities at Fair value:				
Other Financial liabilities	₩ -	₩ 2,466	₩ -	₩ 2,466

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	December 31, 2018			
	Level 1 ¹	Level 2 ¹	Level 3 ¹	Total
Financial assets at Fair value:				
Financial assets at Fair Value through Other Comprehensive Income	₩ -	₩ 37,579	₩ 91,972	₩ 129,551
Financial assets at Fair Value through Profit or Loss	12,480	2,972	6,946	22,398
Other Financial assets	-	13,981	-	13,981
Total	<u>₩ 12,480</u>	<u>₩ 54,532</u>	<u>₩ 98,918</u>	<u>₩ 165,930</u>
Financial liabilities at Fair value:				
Financial liabilities at fair value through profit or loss	₩ -	₩ 626	₩ -	₩ 626
Other financial liabilities	-	15,803	-	15,803
Total	<u>₩ -</u>	<u>₩ 16,429</u>	<u>₩ -</u>	<u>₩ 16,429</u>

¹ The defined levels of the above fair value hierarchy classifications of the financial instruments that are measured at fair value, are as follows:

Classification	Description
Level 1	Quoted prices (unadjusted) in active markets for identical assets or liabilities
Level 2	All inputs other than quoted prices included in level 1 that are observable (either directly that is, prices, or indirectly that is, derived from prices) for the asset or liability
Level 3	Unobservable inputs for the asset or liability

- Level 1: The fair value of financial instruments traded in active markets (such as publicly traded derivatives and equity securities) is based on quoted market prices at the end of the reporting period. The quoted market price used for financial assets held by the Group is the current bid price. These instruments are included in level 1.

- Level 2: The fair value of financial instruments that are not traded in an active market (for example, over-the-counter derivatives) is determined using valuation techniques which maximize the use of observable market data and rely as little as possible on entity-specific estimates. If all significant inputs required to fair value an instrument are observable, the instrument is included in level 2.

-Level 3: If one or more of the significant inputs is not based on observable market data, the instrument is included in level 3. This is the case for unlisted equity securities.

(3) Valuation technique and inputs used in the fair value measurements for hedge derivatives (categorized within Level 2 of the fair value hierarchy) as at December 31, 2019, are as follows:

Valuation technique	Observable Inputs	Description
Present value technique	Forward exchange rate	Based on forward exchange rate disclosed on the market of which remaining period to the maturity equals to that of the forward contract. If there is not any forward exchange rate disclosed under the same conditions stated above, it is calculated by using interpolation method.
	Discount rate	Measured based on the yield curve derived from the market rates disclosed at the end of the reporting period.

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(4) Changes in level 3 for recurring fair value measurements for the year ended December 31, 2019, are as follows:

(in millions of Korean won)

	Beginning balance	Total comprehensive income		Purchases (Issues)	Sales (Settlements)	Others ¹	Ending balance
		Profit or loss	Other comprehensive income				
Financial assets at fair value through other comprehensive income	₩ 91,972	₩ -	₩ -	₩ -	₩ (89,098)	₩ (1,937)	₩ 937
Financial assets at fair value through profit or loss	6,946	(468)	-	5,343	-	(168)	11,653
Total	₩ 98,918	₩ (468)	₩ -	₩ 5,343	₩ (89,098)	₩ (2,105)	₩ 12,590

¹ Changes due to business combination and exchange differences.

(5) Net gains or losses on each category of financial instruments for the years ended December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019						Other comprehensive income ¹
	Profit or Loss						
	Interest income (expense)	Dividend income	Loss on valuation	Impairment reversal	Gain (loss) on disposal	Other	
Financial assets:							
Financial Assets at Amortized Cost	₩ 17,845	₩ -	₩ -	₩ 822	₩ (14,333)	₩ -	₩ -
Financial assets at fair value through other comprehensive income	-	12,462	-	-	-	-	-
Financial assets at fair value through profit or loss	1,987	520	(3,674)	-	-	-	-
Total	₩ 19,832	₩ 12,982	₩ (3,674)	₩ 822	₩ (14,333)	₩ -	₩ -
Financial liabilities:							
Financial liabilities at amortized cost	₩ (188,696)	₩ -	₩ -	₩ -	₩ (401)	₩ -	₩ -
Other financial liabilities	(3,326)	-	-	-	-	(10,241)	-
Total	₩ (192,022)	₩ -	₩ -	₩ -	₩ (401)	₩ (10,241)	₩ -

¹ The amounts are not adjusted for deferred income tax effect.

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	2018									
	Profit or Loss						Other comprehensive income ¹			
	Interest income (expense)	Dividend income	Loss on valuation	Impairment reversal	Gain (loss) on disposal	Other				
Financial assets:										
Financial Assets at Amortized Cost	₩ 14,872	₩ -	₩ -	₩ (1,318)	₩ (11,703)	₩ -	₩ -	₩ -	₩ -	₩ -
Financial assets at fair value through other comprehensive income	-	3,181	-	-	-	-	-	-	-	412
Financial assets at fair value through profit or loss	-	1,085	(112)	-	1,227	-	-	-	-	-
Total	₩ 14,872	₩ 4,266	₩ (112)	₩ (1,318)	₩ (10,477)	₩ -	₩ -	₩ -	₩ -	₩ 412
Financial liabilities:										
Financial liabilities at amortized cost	₩ (196,306)	₩ -	₩ -	₩ -	₩ (1,985)	₩ -	₩ -	₩ -	₩ -	₩ -
Other financial liabilities	-	-	-	-	-	(9,337)	-	-	-	-
Total	₩ (196,306)	₩ -	₩ -	₩ -	₩ (1,985)	₩ (9,337)	₩ -	₩ -	₩ -	₩ -

¹ The amounts are not adjusted for deferred income tax effect.

Among the financial instruments above, the gain of ₩ 5,282 million from derivatives designated as a cash flow hedge was recognized as other comprehensive income for the year ended December 31, 2019 (2018: gain of ₩ 847 million)(Note 9).

In addition, foreign exchange differences, either realized or not, related to foreign currency transactions (other than derivative contracts) mostly resulted from loans and receivables and financial liabilities measured at amortized cost.

11. Interests in Associates and Joint ventures

(1) Set out below are the associates and joint ventures of the Group as at December 31 2019 that are material to the Group.

Name of entity	Type of business	Location	Date of financial statements
Associates:			
Doosan Cuvex Co., Ltd.	Operation of resort and golf club	Korea	December 31
DBC Co., Ltd.	Property leasing	Korea	December 31
Potenit Co., Ltd.	Manufacturing	Korea	December 31
Joint ventures:			
Doosan PSI LLC	Manufacturing and Sales	USA	December 31
Doosan Infracore Liaoning Machinery Sales Co., Ltd.	Sales	China	December 31
Tianjin Lovol Doosan Engine Co., Ltd.	Manufacturing and Sales	China	December 31

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(2) Details of investments in associates and joint ventures as at December 31, 2019 and 2018, are summarized as follows:

(in millions of Korean won)

Name of entity	Percentage of ownership (%)	Acquisition cost		Carrying amount		Proportionate share of net assets	
		2019	2018	2019	2018	2019	2018
Associates:							
Doosan Cuvex Co., Ltd.	28.64	₩ 32,068	₩ 32,068	₩ 30,683	₩ 29,127	₩ 29,381	₩ 27,826
DBC Co., Ltd.	49.90	53,066	24,592	52,221	24,142	51,520	24,142
Potenit Co., Ltd.	27.80	5,333	5,333	-	4,779	(1,485)	(861)
Subtotal		₩ 90,467	₩ 61,993	₩ 82,904	₩ 58,048	₩ 79,416	₩ 51,107
Joint ventures:							
Doosan PSI LLC	50.00	₩ 1,108	₩ 1,108	₩ 2,181	₩ 1,337	₩ 2,181	₩ 1,337
Tianjin Lovol Doosan Engine Co., Ltd.	50.00	25,640	12,727	17,787	8,235	20,311	11,066
Doosan Infracore Liaoning Machinery Sales Co., Ltd.	43.00	718	718	107	292	259	450
Subtotal		27,466	14,553	20,075	9,864	22,751	12,853
Total		₩ 117,933	₩ 76,546	₩ 102,979	₩ 67,912	₩ 102,167	₩ 63,960

(3) Changes in investment in associates and joint ventures for the year ended December 31, 2019 and 2018 are as follows:

(in millions of Korean won)

Name of entity	2019							
	Beginning balance	Acquisition	Share of profit (loss)	Impairment	Share of other comprehensive income of associates	Share of associates' changes in retained earnings	Others	Ending balance
Doosan Cuvex Co., Ltd.	₩ 29,127	₩ -	₩ 2	₩ -	₩ 1,733	₩ (179)	₩ -	₩ 30,683
DBC Co., Ltd.	24,142	28,474	(395)	-	-	-	-	52,221
Doosan PSI LLC	1,337	-	802	-	-	-	42	2,181
Doosan Infracore Liaoning Machinery Sales Co., Ltd.	292	-	(193)	-	-	-	8	107
Tianjin Lovol Doosan Engine Co., Ltd.	8,235	12,913	(3,139)	-	-	-	(222)	17,787
Potenit Co., Ltd.	4,779	-	(623)	(4,156)	-	-	-	-
Total	₩ 67,912	₩ 41,387	₩ (3,546)	₩ (4,156)	₩ 1,733	₩ (179)	₩ (172)	₩ 102,979

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Name of entity	2018						Ending balance
	Beginning balance	Acquisition	Share of profit (loss)	Share of associates' changes in retained earnings	Others		
Doosan Cuvex Co., Ltd.	₩ 29,367	₩ -	₩ (123)	₩ (117)	₩ -	₩ 29,127	
DBC Co., Ltd. ¹	60,971	-	(405)	-	(36,424)	24,142	
Doosan PSI LLC	1,091	-	196	-	50	1,337	
Doosan Infracore Liaoning Machinery Sales Co., Ltd	410	-	(119)	-	1	292	
Tianjin Lovol Doosan Engine Co., Ltd.	-	12,727	(3,998)	-	(494)	8,235	
Potenit Co., Ltd.	-	5,333	(553)	-	(1)	4,779	
Total	₩ 91,839	₩ 18,060	₩ (5,002)	₩ (117)	₩ (36,868)	₩ 67,912	

¹ Investment of ₩36,424 million was collected due to the equal reduction of capital for the year ended December 31, 2018

(4) The tables below provide summarized financial information for investment in associates and joint ventures.

(in millions of Korean won)

Name of entity	2019					Total comprehensive income
	Total assets	Total liabilities	Sales	Profit (loss) for the year		
Doosan Cuvex Co., Ltd.	₩ 220,792	₩ 118,214	₩ 68,412	₩ 7	₩ 6,056	
DBC Co., Ltd.	322,297	219,050	-	(814)	(814)	
Doosan PSI LLC	9,924	5,561	19,412	1,605	1,605	
Doosan Infracore Liaoning Machinery Sales Co., Ltd.	1,807	1,205	14,864	(449)	(449)	
Tianjin Lovol Doosan Engine Co., Ltd	41,629	1,007	-	(6,278)	(6,278)	
Potenit Co., Ltd.	6,041	11,380	1,565	(2,243)	(2,243)	

(in millions of Korean won)

Name of entity	2018					Total comprehensive income
	Total assets	Total liabilities	Sales	Profit (loss) for the year		
Doosan Cuvex Co., Ltd.	₩ 213,382	₩ 100,557	₩ 66,051	₩ 499	₩ 91	
DBC Co., Ltd.	282,276	178,214	-	(1,778)	(1,778)	
Doosan PSI LLC	8,695	6,021	16,091	387	387	
Doosan Infracore Liaoning Machinery Sales Co., Ltd.	1,826	780	15,415	(194)	(194)	
Tianjin Lovol Doosan Engine Co., Ltd	22,353	223	-	(2,334)	(2,334)	
Potenit Co., Ltd.	8,478	11,575	813	(1,901)	(1,901)	

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(5) The tables below provide a reconciliation of the summarized financial information presented to the carrying amount of its interest in the joint venture or associate.

(in millions of Korean won)

	2019									
	Net assets at the end of the year (a)	Group's share in % (b)	Group's share in KRW(a*b)	Adjustments			Carrying amount			
				Basis differences	Intergroup transaction	Others				
Doosan Cuvex Co., Ltd. ¹	₩ 102,578	28.64	₩ 29,381	₩ 1,301	₩ -	₩ -	₩ 30,683			
DBC Co., Ltd.	103,247	49.90	51,520	701	-	-	52,221			
Doosan PSI LLC	4,363	50.00	2,181	-	-	-	2,181			
Doosan Infracore Liaoning Machinery Sales Co., Ltd.	602	43.00	259	-	(152)	-	107			
Tianjin Lovol Doosan Engine Co., Ltd	40,622	50.00	20,311	-	(2,525)	-	17,787			
Potenit Co., Ltd.	(5,339)	27.80	(1,485)	5,641	-	(4,156)	-			

¹ Interests of preferred shares are not included.

12. Property, Plant and Equipment

(1) Changes in property, plant and equipment for the years ended December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019									
	Land	Buildings	Structures	Machinery	Vehicles	Tools	Equipment	Construction in progress	Total	
Opening net book amount	₩ 794,174	₩ 406,001	₩ 33,579	₩ 371,008	₩ 3,332	₩ 55,874	₩ 11,989	₩ 106,676	₩ 1,782,633	
Acquisitions / Capital expenditure	2,147	20,016	1,630	48,227	1,770	35,592	11,385	145,360	266,127	
Revaluation	36,658	-	-	-	-	-	-	-	36,658	
Transfers	(14,910)	7,148	10,702	90,081	8	1,979	(353)	(129,487)	(34,832)	
Disposals	(34,413)	(3,109)	(63)	(1,891)	(828)	(378)	(114)	(3,708)	(44,504)	
Depreciation	-	(19,113)	(3,094)	(96,988)	(1,013)	(21,592)	(4,987)	-	(146,787)	
Impairment loss	(64)	-	-	-	-	-	-	-	(64)	
Others	808	4,771	191	4,093	49	59	175	2,079	12,225	
Closing net book amount	₩ 784,400	₩ 415,714	₩ 42,945	₩ 414,530	₩ 3,318	₩ 71,534	₩ 18,095	₩ 120,920	₩ 1,871,456	
Acquisition cost	₩ 493,997	₩ 702,088	₩ 97,325	₩ 1,176,528	₩ 13,597	₩ 289,369	₩ 82,936	₩ 120,920	₩ 2,976,760	
Accumulated depreciation	-	(234,467)	(47,778)	(743,534)	(9,730)	(209,542)	(63,195)	-	(1,308,246)	
Accumulated impairment losses	(5,929)	(47,907)	(6,602)	(16,517)	(549)	(8,293)	(1,646)	-	(87,443)	
Accumulated gain on revaluation	296,332	-	-	-	-	-	-	-	296,332	
Government grants	-	(4,000)	-	(1,947)	-	-	-	-	(5,947)	

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	2018								
	Land	Buildings	Structures	Machinery	Vehicles	Tools	Equipment	Construction in progress	Total
Opening net book amount	₩ 817,287	₩ 408,408	₩ 34,890	₩ 403,713	₩ 2,651	₩ 53,084	₩ 9,824	₩ 57,047	₩ 1,786,904
Acquisitions / Capital expenditure	4,555	12,141	1,472	25,012	1,913	25,824	5,869	93,167	169,953
Transfers	(5,492)	5,558	758	35,678	440	(125)	603	(45,777)	(8,357)
Disposals	(21,758)	(3,578)	(35)	(1,877)	(617)	(685)	(239)	(377)	(29,166)
Depreciation	-	(18,570)	(3,092)	(93,139)	(1,019)	(22,244)	(4,094)	-	(142,158)
Impairment loss	-	(1,233)	(360)	(461)	-	-	-	-	(2,054)
Reversal of Impairment loss	-	-	-	-	-	18	-	-	18
Others	(418)	3,275	(54)	2,082	(36)	2	26	2,616	7,493
Closing net book amount	₩ 794,174	₩ 406,001	₩ 33,579	₩ 371,008	₩ 3,332	₩ 55,874	₩ 11,989	₩ 106,676	₩ 1,782,633
Acquisition cost	₩ 536,688	₩ 677,672	₩ 84,762	₩ 1,080,020	₩ 13,623	₩ 255,583	₩ 75,407	₩ 106,676	₩ 2,830,431
Accumulated depreciation	-	(216,459)	(44,671)	(687,871)	(9,736)	(191,230)	(61,648)	-	(1,211,615)
Accumulated impairment losses	(5,821)	(51,078)	(6,512)	(17,427)	(555)	(8,479)	(1,770)	-	(91,642)
Accumulated gain on revaluation	263,307	-	-	-	-	-	-	-	263,307
Government grants	-	(4,134)	-	(3,714)	-	-	-	-	(7,848)

Land, after initial recognition, is measured using a revaluation model. As at December 31, 2019 the carrying amount of land would be ₩ 493,997 million if measured based on a cost model.

Certain land, buildings and machinery are pledged as collaterals as at December 31, 2019, in connection with the borrowings from Korea Development Bank and others. Also, certain property, plant and equipment are pledged as collaterals in relation to the Group's private bonds as at December 31, 2019 (Note 34).

(2) The Group revalued its land assets as follows:

For the year ended December 31, 2013, the Group initially remeasured all land assets using fair value at the date of the revaluation. As at December 31, 2019, the fair values of land assets are determined from appraisal that is undertaken by independently qualified valuers, Kyungil Appraisal and Realty Advisa Co., Ltd. ("Kyungil") and others on November 30, 2019. KYUNGIL and others are members of Korea Association of Property Appraisers and comprise certified professionals that have a significant amount of industry experience.

Fair value of a land is determined by reference to Officially Assessed Reference Land Price ("OARLP"), announced by the Ministry of Land, Infrastructure, and Transport, and recent market transactions of similar and recently sold parcels nearby the subject land in order to derive an indication of the most probable sales price (or value) of the land.

(3) Fair value measurements of land asset by fair value hierarchy level as at December 31, 2019, are as follows:

(in millions of Korean won)

Type	Level 1	Level 2	Level 3	Total
Land	₩ -	₩ -	₩ 784,400	₩ 784,400

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(4) Valuation methodologies and inputs used for fair value measurements of land assets are as follows:

Valuation methodology	Significant inputs that are not based on observable market data (unobservable inputs)	Correlation between unobservable inputs and fair value arguments
Officially Assessed Reference Land Price	Fluctuation rate of land price and others	Fair value increases (decreases) if rate of land price increases (decreases)
OARLP of similar parcels nearby the subject land, reflating corrections necessary for differences between the subject and the comparable	Parcel conditions and others	Fair value increases (decrease) if corrections of parcel conditions and others increase (decrease)
	Land conditions affecting the sales price and others	Fair value increases (decreases) if correction of land conditions affecting the sales price increases (decreases)

(5) The effect of applying revaluation model to land for the year ended December 31, 2019 is as follows:

(in millions of Korean won)

Beginning balance	Acquisitions	Revaluation	Impairment loss	Disposals	Others	Ending balance
₩ 794,174	₩ 2,147	₩ 36,658	₩ (64)	₩ (34,413)	₩ (14,102)	₩ 784,400

(6) Borrowing costs added to the cost of property, plant and equipment for the years ended December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019	2018
Borrowing costs added to the cost of property, plant and equipment	₩ 446	₩ 832
Interest rate (%)	4.20%	4.19%

(7) Classification of depreciation expenses for the years ended December 31, 2019 and 2018, is as follows:

(in millions of Korean won)

	2019	2018
Cost of sales	₩ 111,357	₩ 109,979
Selling and administrative expenses	16,612	13,405
Research and development expenses, etc.	18,818	18,774
Total	₩ 146,787	₩ 142,158

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13. Intangible Assets

(1) Changes in intangible assets for the years ended December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019					
	Goodwill	Industrial rights	Development cost	Greenhouse Gas Emission Rights	Other Intangible Assets	Total
Beginning balance	₩ 2,920,112	₩ 1,091,733	₩ 233,055	₩ 2,200	₩ 81,556	₩ 4,328,656
Additions – internal development	-	-	93,672	-	-	93,672
Acquisitions	23,807	32,680	-	-	32,623	89,110
Transfers	-	635	191	-	17,031	17,857
Disposals	(3,741)	-	-	-	(62)	(3,803)
Amortization	-	(921)	(49,472)	-	(26,577)	(76,970)
Impairment loss	-	-	(5,587)	-	-	(5,587)
Others	85,234	30,053	3,395	-	751	119,433
Ending balance	₩ 3,025,412	₩ 1,154,180	₩ 275,254	₩ 2,200	₩ 105,322	₩ 4,562,368
Acquisition cost	₩ 3,060,674	₩ 1,324,903	₩ 926,235	₩ 2,200	₩ 484,194	₩ 5,798,206
Accumulated amortization	-	(170,723)	(549,808)	-	(349,247)	(1,069,778)
Accumulated impairment loss	(35,262)	-	(101,173)	-	(29,625)	(166,060)

(in millions of Korean won)

	2018					
	Goodwill	Industrial rights	Development cost	Greenhouse Gas Emission Rights	Other Intangible Assets	Total
Beginning balance	₩ 2,796,421	₩ 1,063,092	₩ 220,543	₩ -	₩ 89,226	₩ 4,169,282
Additions – internal development	-	-	90,915	-	-	90,915
Acquisitions	-	1	-	2,200	16,488	18,689
Transfers	-	537	184	-	6,464	7,185
Disposals	-	-	-	-	(178)	(178)
Amortization	-	(848)	(66,158)	-	(30,932)	(97,938)
Impairment loss	-	-	(15,810)	-	(307)	(16,117)
Others	123,691	28,951	3,381	-	795	156,818
Ending balance	₩ 2,920,112	₩ 1,091,733	₩ 233,055	₩ 2,200	₩ 81,556	₩ 4,328,656
Acquisition cost	₩ 2,954,622	₩ 1,257,146	₩ 823,367	₩ 2,200	₩ 431,492	₩ 5,468,827
Accumulated amortization	-	(165,413)	(494,694)	-	(320,222)	(980,329)
Accumulated impairment loss	(34,510)	-	(95,618)	-	(29,714)	(159,842)

The aggregated carrying amount of goodwill and others with indefinite useful lives in other intangible assets item is ₩ 4,185,909 million and ₩ 4,018,278 million as at December 31, 2019 and 2018, respectively.

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The consolidated company performed the Industrial rights impairment test using the recoverable value at December 31, 2019. And, did not recognize any impairment losses as the book value did not exceed the recoverable amount.

(2) Greenhouse Gas Emission Rights

Changes in the Greenhouse Gas Emission Rights for the years ended December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	2019		2018	
	Quantity	Amount	Quantity	Amount
Beginning balance	118,763	₩ 2,200	145,810	₩ -
Allocation with nil consideration (allocation cancellation)	143,361	-	71,074	-
Purchases	-	-	100,000	2,200
Sales	(3,000)	-	(109,549)	-
Surrendered to the government ¹	(93,595)	-	(88,650)	-
Ending balance	165,529	₩ 2,200	118,685	₩ 2,200

¹ The quantity of surrendered to the government for the year ended December 31, 2019 is an estimation, which will be settled in 2020.

(3) Carrying amount and remaining amortization period of each significant development project as at December 31, 2019, is as follows:

<i>(in millions of Korean won)</i>	Name of development asset	Carrying amount	Remaining amortization period ¹
Development costs in development	Development project for Stage 5	₩ 19,991	-
	Development project for vehicle engines	13,253	-
	Development project for electronic generator engine	9,567	-
	Development project for Gen 6 Loaders	31,028	-
	Development project for Stage 5	21,870	51-57 months
Amortized development costs	Development project for large-sized excavator(DX800)	2,901	29 months
	Development project for BHL	4,889	59 months

¹ Remaining amortization period is presented only when amortization was begun. Otherwise, remaining amortization period is presented as "-".

(4) Impairment losses on intangible assets for the year ended December 31, 2019, is as follows:

Related account	Separate asset	Acquisition cost	After amortization Book value	Impairment loss ¹		Carrying amount	Recoverable amount valuation method
				2019	Accumulated		
Development costs	Development of DL06 engine	₩ 5,202	₩ 2,819	₩ 763	₩ 2,318	₩ 501	Value in use
	Development of Medium Frame GenV, etc.	135,489	4,824	4,824	4,824	-	Value in use
Total		₩ 140,691	₩ 7,643	₩ 5,587	₩ 7,142	₩ 501	

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¹ Certain part of the carrying amount was recognized as impairment loss due to the decrease in value-in-use compared to the estimation made at the time of development.

(5) Classification of Impairment losses for the years ended December 31, 2019 and 2018, is as follows:

<i>(in millions of Korean won)</i>	2019		2018	
Non-operating expenses	₩	5,587	₩	16,117

(6) Borrowing costs added to the cost of intangible assets for the years ended December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	2019		2018	
Borrowing costs added to the cost of intangible assets	₩	3,359	₩	2,308
Interest rate (%)		4.20		4.19

(7) Classification of amortization expenses for the years ended December 31, 2019 and 2018, is as follows:

<i>(in millions of Korean won)</i>	2019		2018	
Cost of sales	₩	52,003	₩	67,204
Selling and administrative expenses		24,825		30,505
Research and development expenses, etc.		142		229
Total	₩	76,970	₩	97,938

(8) The Group recognized total research and development costs of ₩ 190,235 million (2018: ₩ 152,876 million) as expenses in Selling and administration expenses.

(9) Impairment test of goodwill

The table below summarizes goodwill allocation for each operating segment.

<i>(in millions of Korean won)</i>	Doosan Bobcat Inc. and subsidiaries		Doosan Infracore Norway AS		Total	
Classification						
Goodwill	₩	3,022,664	₩	2,748	₩	3,025,412

The Group uses cash flow projections based on financial budgets approved by the directors covering five-year periods for a value-in-use calculation. The financial budgets are determined based on historical result and expectation of market growth. The assumptions for the calculation of value-in-use, as at December 31, 2019, are as follows:

Classification	Doosan Bobcat Inc. and subsidiaries	Doosan Infracore Norway AS
Growth rate	1.50%	1.50%
Discount rate	7.85%	11.40%

Cash flows beyond that five-year periods have been extrapolated using the fifth-year cash flow. The growth rate does not exceed long-term average growth rate of market, and the discount rates used reflect relevant risks specific to the cash-generating units.

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The Group calculated recoverable amount for each cash-generating unit based on value-in-use, and concluded that there was no impairment loss to recognize for the year ended December 31, 2019, since the total carrying amount did not exceed the recoverable amount.

14. Investment Properties

Changes in investment properties for the years ended December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	2019			2018		
	Land	Building	Total	Land	Building	Total
Beginning balance	₩ 23,673	₩ 2,635	₩ 26,308	₩ 18,246	₩ 2,364	₩ 20,610
Additions	70,618	19,324	89,942	-	-	-
Transfers ¹	18,286	5,342	23,628	5,985	430	6,415
Depreciation	-	(991)	(991)	-	(159)	(159)
Impairment loss	-	(57)	(57)	(504)	-	(504)
Others	-	-	-	(54)	-	(54)
Ending balance	₩ 112,577	₩ 26,253	₩ 138,830	₩ 23,673	₩ 2,635	₩ 26,308
Acquisition cost	₩ 127,655	₩ 32,518	₩ 160,173	₩ 38,694	₩ 5,972	₩ 44,666
Accumulated depreciation	-	(5,134)	(5,134)	-	(2,263)	(2,263)
Accumulated impairment losses	(15,078)	(1,131)	(16,209)	(15,021)	(1,074)	(16,095)

¹ Replaced from property, plant and equipment during the current period.

Fair value of land in Investment properties as at December 31, 2019, is ₩ 121,927 million. Meanwhile, during the year, rental income from investment property is ₩ 4,734 million (2018: ₩ 257 million).

15. Lease

(1) Changes in right-of-use assets for the years ended December 31, 2019, are as follows:

<i>(in millions of Korean won)</i>	2019						
	Land	Buildings	Machinery	Vehicles	Tools	Equipment	Total
Beginning balance	₩ -	₩ -	₩ -	₩ -	₩ -	₩ -	₩ -
Change in accounting policy	17,972	52,851	1,882	6,597	25	4,927	84,254
Acquisition	275	25,991	40	6,529	-	1,185	34,020
Termination of lease agreement	-	-	-	(191)	-	-	(191)
Depreciation	(772)	(15,989)	(743)	(4,374)	(8)	(2,227)	(24,013)
Others	335	1,012	57	15	2	186	1,607
Ending balance	₩ 17,810	₩ 63,965	₩ 1,236	₩ 8,576	₩ 19	₩ 4,071	₩ 95,677
Acquisition cost	₩ 18,573	₩ 79,716	₩ 1,975	₩ 12,949	₩ 27	₩ 6,284	₩ 119,524
Accumulated depreciation	(763)	(15,751)	(739)	(4,373)	(8)	(2,213)	(23,847)

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(2) Changes in lease liabilities for the years ended December 31, 2019, are as follows:

<i>(in millions of Korean won)</i>	Lease liabilities	
Beginning balance	₩	-
Change in accounting policy		66,500
Payment for lease liabilities		(24,749)
Acquisition of right-of-use assets		34,020
Termination of lease agreement		(499)
Interest expenses		3,326
Others		808
Ending Balance	₩	<u>79,406</u>

(3) Classification of depreciation of right-of-use assets for the years ended December 31, 2019, is as follows:

<i>(in millions of Korean won)</i>	2019	
Cost of sales	₩	8,654
Selling and administrative expenses		14,784
Research and development cost, etc.		575
	₩	<u>24,013</u>

(4) Details of the Group's maturity analysis of lease liabilities as at December 31, 2019, are as follows:

<i>(in millions of Korean won)</i>	2019				
	Nominal cash flows				
	Total	Less than 1 year	Less than 2 year	Less than 5 year	More than 5 years
Lease liabilities	90,676	29,801	19,531	22,053	19,291

(5) Expenditures on short-term leases or leases of low-value assets for the years ended December 31, 2019, are as follows:

<i>(in millions of Korean won)</i>	2019	
Cost of sales	₩	1,050
Selling and administrative expenses		10,722
Research and development cost, etc.		372
	₩	<u>12,144</u>

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16. Trade and Other Payables

Trade and other payables as at December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	2019	2018
Current :		
Trade payables	₩ 953,513	₩ 1,037,815
Other payables	268,610	293,403
Accrued expenses	377,326	282,606
Total	₩ 1,599,449	₩ 1,613,824
Non-current :		
Other payables	₩ 1,370	₩ 1,157

17. Borrowings and Bonds

(1) Details of carrying amount of bonds as at December 31, 2019 and 2018, are as follows:

<i>(in thousands of foreign currencies and millions of Korean won)</i>	Category	Annual interest rate (%) as at December 31, 2019	2019	2018
Public bonds		2.25~5.87	₩ 1,158,680	₩ 757,860
Private bonds		4.10~5.10	298,000	232,000
Bond with warrant		2.00	494,546	494,561
	Subtotal		₩ 1,951,226	₩ 1,484,421
	Less: present value of discount		(9,601)	(6,639)
	Less: present value of discount on bonds with warrant		(4,636)	(6,235)
	Less: Redemption Premium on bonds with warrant		76,247	76,249
	Adjustment on bonds with warrants		(73,165)	(98,396)
	Subtotal		₩ 1,940,071	₩ 1,449,400
	Less: current portion(including present value of discount)		(1,037,595)	(505,339)
	Total		₩ 902,476	₩ 944,061

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(2) Details of carrying amount of long-term and short-term borrowings as at December 31, 2019 and 2018, are as follows:

1) Short-term borrowings

(in thousands of foreign currencies and millions of Korean won)

Category	Creditor	Annual interest rate (%) as at December 31, 2019		2019		2018
Borrowings in Korean Won	Korea Exim Bank and others	2.57~3.95	₩	329,083	₩	593,500
Borrowings in foreign currencies	Korea Development Bank and others	3M Libor+1.94, 4.35~5.96		172,613		241,074
Usance	Shinhan Bank and others	0.28~3.01		79,374		89,936
Transferred receivables ¹	KEB Hana Bank and others	-		10,013		13,090
	Total		₩	591,083	₩	937,600

¹ Financial liabilities related to transferred trade receivables that do not meet the derecognition criteria amounted to ₩ 10,013 million and ₩ 13,090 million as at December 31, 2019 and 2018, respectively. Trade receivables are pledged as collaterals for these liabilities.

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2) Long-term borrowings

(in thousands of foreign currencies and millions of Korean won)

Category	Creditor	Annual interest rate (%) as at December 31, 2019	2019	2018
Borrowings in Korean Won	Korea Development Bank and others	3.99~4.40	₩ 380,000	₩ 380,000
Borrowings in foreign currencies	Korea Exim Bank	-	-	USD 117,600
	The Export-Import bank of China	5.00	USD 89,000	USD 89,000
	Korea Exim Bank	5.00	USD 30,000	USD 20,000
	Korea Exim Bank	2.33	EUR 38,000	EUR 38,000
	US multiple institutions of investors and banks	3M Libor+2.00	USD 657,013	USD 971,463
	BNP Paribas	2.3~2.75	USD 13,193	USD 15,232
	Innovasjon Norge, etc.	3.65~4.65	NOK 13,270	NOK 17,387
	Bank of New York	8.00	USD 4,250	USD 4,250
	Cinda Financial Leasing Co., Ltd	5.46~5.70	CNY 111,490	CNY 228,343
	Industrial and Commercial Bank of China	-	-	CNY 301
	China Railway Construction Financial Leasing Co., Ltd.	4.57~4.99	CNY 45,377	CNY 243,652
	Bank of Tianjin Financial Leasing Co., Ltd.	5.23	CNY 43,404	CNY 143,805
				EUR 38,000
	Subtotal		USD 793,456	USD 1,217,545
			CNY 200,271	CNY 616,101
			NOK 13,270	NOK 17,387
	Korean won equivalent		₩ 1,382,721	₩ 1,892,341
	Less: present value of discount		(10,336)	(10,532)
	Subtotal		₩ 1,372,385	₩ 1,881,809
	Less: current portion		(621,376)	(173,048)
	Total		₩ 751,009	₩ 1,708,761

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(3) Detailed terms of bonds with warrant as at December 31, 2019 are as follows:

1) Details of changes and issuance conditions of bonds with warrant issued by the Group as at December 31, 2019 are as follows:

Date of issue	Maturity date	Coupon rate(%)	YTM(%)	Exercisable period	Exercise price	Issuing price
2017-08-01	2022-08-01	2.00%	4.75%	From one month after date of issue to one month before maturity	₩ 8,030 per share	₩ 500,000 million

① Early redemption clause

The early redemption right is exercisable as a whole or in part against the par value of bond with stock warrants at the interest payment date in 3 years after the date of issuance of bonds.

② Maturity redemption

The coupon rate for the bond is 2.0% and for bonds not converted until maturity, 115.4175% of the principal amount will be paid on August 1, 2022 with a yield to maturity rate of 4.75% compounded quarterly.

③ Calculation of the exercise price

The exercise price will be adjusted when there is an increase in paid-in capital through issuance of shares at a price lower than the market price, stock dividends, or capitalization of reserves, before exercising the stock warrants or when there is an issuance of stock purchase warrants or debt securities with warrants. The exercise price of stock warrants was adjusted to ₩7,620 from October 31, 2018, ₩7,170 from April 30, 2019, ₩6,430 from July 31, 2019.

2) Details of bonds with warrants as at December 31, 2019 are as follows:

(in millions of Korean won)

Type	Beginning balance	Exercise/Amortization	Ending balance
Bonds with warrant	₩ 494,561	₩ (15)	₩ 494,546
Redemption Premium on bonds with warrant	76,249	(2)	76,247
Present value of discount	(6,235)	1,599	(4,636)
Stock warrants adjustment	(98,396)	25,231	(73,165)
Carrying amount	₩ 466,179	₩ 26,813	₩ 492,992
Compensation for stock warrants(other capital surplus)	₩ 41,481	₩ (3)	₩ 41,478

Due to the exertion of stock warrant, as at December 31, 2019, 1.13% of the outstanding balance of 31st warrant were exercised and 1.09% of the principal amount of the bonds was paid. The cumulative number of shares issued as a result of the exertion of stock warrants for 31st warrants is 705,965.

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18. Net Defined Benefit Liabilities

(1) Details of net defined benefit liabilities recognized in the statements of financial position as at December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	2019		2018	
Present value of funded defined benefit obligations	₩	1,058,837	₩	973,888
Fair value of plan assets ¹		(629,499)		(567,782)
Net defined benefit liabilities	₩	429,338	₩	406,106

¹ The contributions to the National Pension Fund of ₩ 141 million are included in the fair value of plan assets as at December 31, 2019 (2018: ₩ 148 million).

(2) Profit and loss recognized for the years ended December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	2019		2018	
Current service cost	₩	35,778	₩	36,308
Past service cost and (gains or) losses on settlements		(8,646)		(6,669)
Net interest cost		17,717		17,514
Total	₩	44,849	₩	47,153

(3) Classification of post-employment benefits for the years ended December 31, 2019 and 2018, is as follows:

<i>(in millions of Korean won)</i>	2019		2018	
Cost of sales	₩	22,890	₩	23,377
Selling and administrative expenses		16,585		18,918
Research and development expenses, etc.		5,374		4,858
Total	₩	44,849	₩	47,153

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(4) Changes in the defined benefit obligations for the years ended December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	2019		2018	
Beginning balance	₩	973,888	₩	1,022,237
Current service cost		35,778		36,308
Past service cost and gains or losses on settlements		(8,646)		(6,669)
Transfer in		4,550		1,854
Transfer out		(616)		(620)
Interest expense		37,865		34,117
Remeasurements:				
Actuarial loss from change in demographic assumptions		(1,539)		(17,437)
Actuarial loss (gain) from change in financial assumptions		120,484		(82,853)
Actuarial loss from others		13,489		2,599
Contributions from employees		3,027		2,509
Payments from plans		(148,281)		(51,319)
Exchange differences		28,838		33,162
Ending balance	₩	1,058,837	₩	973,888

(5) Changes in the fair value of plan assets for the years ended December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	2019		2018	
Beginning balance	₩	567,782	₩	570,379
Expected return on plan assets		20,148		16,603
Transfer in		2,764		913
Transfer out		(338)		(383)
Remeasurements:		77,387		(47,920)
Contributions from employees		25		22
Contributions from employers		73,021		43,580
Payments from plans:		(127,711)		(32,163)
Exchange differences		16,421		16,751
Ending balance	₩	629,499	₩	567,782

Actual gain or loss on plan assets is recognized as ₩ 97,535 million (gain) and ₩ 31,317 million (loss) for the years ended December 31, 2019 and 2018, respectively. The Group plans to contribute ₩ 81,098 million to the defined benefit plans in 2020.

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(6) The significant actuarial assumptions as at December 31, 2019 and 2018, are as follows:

<i>(in percentage, %)</i>	<u>2019</u>	<u>2018</u>
Discount rate	1.30~3.30	2.00 ~ 4.30
Salary increase rate	0.08~4.20	2.10 ~ 4.80

(7) Plan assets as at December 31, 2019 and 2018 consist of:

<i>(in millions of Korean won)</i>	<u>2019</u>		<u>2018</u>	
Time deposits	₩	175,251	₩	128,674
Equity instruments		156,575		135,883
Debt instruments		256,732		272,559
Others		40,941		30,666
Total	₩	<u>629,499</u>	₩	<u>567,782</u>

The expected return on plan assets is determined by considering the expected return applicable to the assets held by the Group in accordance with its current investment strategy. Expected rate of return on debt securities is based on total redemption yield at the end of the reporting period. For equity securities and investment of other assets, expected return reflects long-term experience of actual rate of return in the market.

(8) The sensitivity of the defined benefit obligation to changes in the principal assumptions is:

<i>(in millions of Korean won)</i>	<u>2019</u>		<u>2018</u>	
	Amount	Rate	Amount	Rate
Discount rate:				
1% increase	₩ (131,521)	(12.42%)	₩ (110,326)	(11.33%)
1% decrease	165,911	15.67%	137,391	14.11%
Salary increase rate:				
1% increase	37,023	3.50%	25,127	2.58%
1% decrease	(24,420)	(2.31%)	(22,303)	(2.29%)

(9) The weighted average maturity of the defined benefit obligation is 14.05 years.

19. Provisions

Changes in provision, for the year ended December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	<u>2019</u>						
	Beginning balance	Increases	Decreases	Others	Ending balance	Less: current portion	Non-current portion
Product warranties	₩ 197,492	₩ 210,018	₩ (125,601)	₩ 4,560	₩ 286,469	₩ (234,214)	₩ 52,255
Others	1,952	8,095	(7,038)	(241)	2,768	(2,768)	-
Total	₩ 199,444	₩ 218,113	₩ (132,639)	₩ 4,319	₩ 289,237	₩ (236,982)	₩ 52,255

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	2018						
	Beginning balance	Increases	Decreases	Others	Ending balance	Less: current portion	Non-current portion
Product warranties	₩ 165,715	₩ 142,715	₩ (92,710)	₩ (18,228)	₩ 197,492	₩ (177,115)	₩ 20,377
Returned goods ¹	5,336	-	(5,427)	91	-	-	-
Others	5,593	5,543	(9,060)	(124)	1,952	(1,952)	-
Total	₩ 176,644	₩ 148,258	₩ (107,197)	₩ (18,261)	₩ 199,444	₩ (179,067)	₩ 20,377

¹ According to the previous accounting standard, the Group recognized the provision for returns by measuring net amounts based on the gross profit. The Group recognizes total expected amounts to refund as the contract liability (refund liability) when return has occurred in Korean IFRS 1115.

The Group recognizes provision by estimating expected expenses in relation to product warranty, return, defect repair services and others on the basis of the warranty period and historical experience and etc. The Group recognizes the provisions of ₩ 30,559 million(2018: ₩ 26,815 million) as other liabilities in relation to the subsidiaries.

20. Share Capital and Capital Surplus

Changes in share capital and capital surplus for the year ended December 31, 2019, are as follows:

(in millions of Korean won)

Date	Description	Number of common stocks issued	Share capital	Capital Surplus	Consideration for Stock Warrants	Other capital surplus
2019.01.01	Beginning balance	208,158,077	₩ 1,040,790	₩ 148,603	₩ 41,481	₩ 22,930
2019.01.31	Exercise of stock warrants	3,095	15	7	(3)	-
2019.02.28	Exercise of stock warrants	107	1	(1)	-	-
2019.03.26	Cancellation of share options	-	-	-	-	59
2019.03.31	Cancellation of share options	-	-	-	-	185
2019.03.31	Reclassification of other Components of equity	-	-	-	-	(58,905)
2019.12.31	Ending balance	208,161,279	₩ 1,040,806	₩ 148,609	₩ 41,478	₩ (35,731)

The Parent Company's total number of authorized shares is 400,000,000 shares and the total number of ordinary shares issued is 208,161,279 shares (2018: 208,158,077 shares) with a par value of ₩ 5,000 per share. As at December 31, 2019, the number of non-voting shares under the Commercial Law is 505 shares (2018: 505 shares).

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21. Other Components of Equity

(1) Other components of equity as at December 31, 2019 and 2018, consist of:

<i>(in millions of Korean won)</i>	2019		2018	
Treasury share	₩	(2)	₩	(2)
Loss on disposal of treasury share		(7,909)		(7,909)
Share options		1,682		1,926
Other capital adjustments		(64,420)		(123,326)
Total	₩	<u>(70,649)</u>	₩	<u>(129,311)</u>

(2) Share-based Payments

The Group granted share options number of times to its directors. Methods to grant share options, issuance of new shares, issuance of treasury shares or cash settlement, are decided by the Board of Directors at their meeting to be held on stock exercise date. These share options carry a two-year service vesting condition, subsequent to the resolution made at the shareholders' meeting. The number of granted options as at December 31, 2019, is as follows:

(in Korean won except for share data)

Date of grant	Description	Number of granted options	Exercisable period	Exercisable price	Expected fair value at the date of grant
2010.03.26	6th grant	14,500	2013.03.26~2020.03.25	19,400	10,543
2011.03.25	7th grant	13,300	2014.03.25~2021.03.24	30,700	16,800
2012.03.30	8th grant	39,400	2015.03.30~2022.03.29	22,300	11,951
2013.03.29	9th grant	38,200	2016.03.29~2023.03.28	15,700	8,477
2014.03.21	10th grant	79,400	2017.03.21~2024.03.20	13,600	6,436
	Total	<u>184,800</u>			

Changes in share option for the year ended December 31, 2019, are as follows:

	Number of common stocks to be issued (in shares)			Valuation amount (in millions of Korean won)		
	Beginning balance	Forfeited	Ending balance	Beginning balance	Increases(Decreases)	Ending balance
5th grant	7,750	(7,750)	-	60	(60)	-
6th grant	25,470	(10,970)	14,500	269	(116)	153
7th grant	14,100	(800)	13,300	236	(13)	223
8th grant	40,600	(1,200)	39,400	485	(14)	471
9th grant	39,800	(1,600)	38,200	338	(14)	324
10th grant	83,600	(4,200)	79,400	538	(27)	511
Total	<u>211,320</u>	<u>(26,520)</u>	<u>184,800</u>	₩ 1,926	₩ (244)	₩ 1,682

There is no expense recognized due to share option granted in prior year. In addition, there is no compensation cost to be recognized for the year ended December 31, 2019, and for prospective period.

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The Group calculated the compensation costs by applying fair value approach. Assumptions used in determining fair value of share options are as follows:

	Risk-free interest rate ¹	Expected exercisable period	Expected volatility	Expected dividend yield ratio
6th grant	4.53%	6.5 years	58.82%	1.34%
7th grant	4.19%	6.5 years	58.01%	1.07%
8th grant	3.80%	6.5 years	57.96%	0.44%
9th grant	2.57%	6.5 years	54.12%	0.21%
10th grant	3.27%	6.5 years	42.29%	0.00%

¹ Risk-free interest rate is based on 5-year and 10-year treasury bond yield rate.

22. Accumulated Other Comprehensive Income

(1) Changes in accumulated other comprehensive income for the years ended December 31, 2019 and 2018, are as follows:

(in millions of Korean won):

		2019					
		Gain on valuation of financial assets at fair value through other comprehensive income	Share of other comprehensive income of associates	Exchange differences	Cash flow hedges	Revaluation reserves of property, plant and equipment	Total
Beginning balance	₩	2,540	₩ 428	₩ (421,392)	₩ (4,435)	₩ 166,054	₩ (256,805)
Increase		-	1,614	61,553	4,483	31,877	99,527
Decrease		(2,540)	-	-	-	-	(2,540)
Ending balance	₩	-	₩ 2,042	₩ (359,839)	₩ 48	₩ 197,931	₩ (159,818)

(in millions of Korean won):

		2018					
		Changes in the fair value of available-for-sale financial assets	Share of other comprehensive income of associates	Exchange differences	Cash flow hedges	Revaluation reserves of property, plant and equipment	Total
Beginning balance	₩	2,244	₩ 428	₩ (500,942)	₩ (4,206)	₩ 168,425	₩ (334,051)
Increase		296	-	79,550	-	-	79,846
Decrease		-	-	-	(229)	(2,371)	(2,600)
Ending balance	₩	2,540	₩ 428	₩ (421,392)	₩ (4,435)	₩ 166,054	₩ (256,805)

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(2) Income tax effects directly recognized in accumulated other comprehensive income (loss) as at December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

		2019		
		Before tax	Deferred tax assets (liabilities)	After tax
Gain on valuation of financial assets at fair value through other comprehensive income	₩	-	₩	-
Share of other comprehensive income of associates		2,042	-	2,042
Exchange differences		(359,839)	-	(359,839)
Unrealized loss on valuation of derivatives		2,920	(2,872)	48
Gain on revaluation of property, plant and equipment		296,333	(98,402)	197,931
Total	₩	(58,544)	₩	(101,274)
			₩	(159,818)

(in millions of Korean won)

		2018		
		Before tax	Deferred tax assets (liabilities)	After tax
Gain on valuation of financial assets at fair value through other comprehensive income	₩	3,384	₩	(844)
Share of other comprehensive income of associates		428	-	428
Exchange differences		(421,392)	-	(421,392)
Unrealized loss on valuation of derivatives		(2,362)	(2,073)	(4,435)
Gain on revaluation of property, plant and equipment		259,677	(93,623)	166,054
Total	₩	(160,265)	₩	(96,540)
			₩	(256,805)

23. Retained Earnings

(1) Retained earnings as at December 31, 2019 and 2018, consist of:

(in millions of Korean won)

	2019		2018	
Retained earnings before appropriation	₩	1,257,868	₩	1,049,189

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(2) The appropriation of retained earnings for the years ended December 31, 2019 and 2018, is as follows:

<i>(in millions of Korean won)</i>	2019	2018
1. Unappropriated retained earnings carried over from prior year	₩ 1,049,189	₩ 784,702
2. Changes in accounting policy	-	(899)
3. Unappropriated retained earnings carried over from prior year – after changes	1,049,189	783,803
4. Profit for the year	239,913	246,410
5. Revaluation and disposal of property, plant and equipment	61	5,373
6. Remeasurements of net defined benefit liabilities	(31,295)	13,693
7. Changes in retained earnings of equity method investment securities	(171)	(105)
8. Valuation of equity instruments at fair value	171	15
9. Unappropriated retained earnings to be carried forward	₩ 1,257,868	₩ 1,049,189

24. Segment Information

The Group's operating segments are as follows:

Business segment	Main products
Engines ("EG")	Engine of the commercial cars and buses, engine parts
Construction Equipment ("CE")	Crawler excavator, excavator parts and others
Construction Equipment ("Bobcat")	Compact (Skid Steer Loader, Compact Track Loader, Mini Excavator), Heavy Excavator, and Portable Power

(1) Profit or loss by each segment for the years ended December 31, 2019 and 2018, are as follows:

	2019			
	Total segment revenue	Inter-segment revenue	Revenue from external customers	Operating profit
EG	₩ 1,109,515	₩ (531,372)	₩ 578,143	₩ 82,353
CE	5,428,316	(2,279,883)	3,148,433	281,029
Bobcat	4,509,550	(50,286)	4,459,264	477,015
Subtotal	11,047,381	(2,861,541)	8,185,840	840,397
Consolidation adjustments	(2,861,541)	2,861,541	-	-
Total	₩ 8,185,840	₩ -	₩ 8,185,840	₩ 840,397

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	2018			
	Total segment revenue	Inter-segment revenue	Revenue from external customers	Operating profit (loss)
EG	₩ 1,030,974	₩ (498,624)	₩ 532,350	₩ 105,660
CE	5,253,655	(1,998,716)	3,254,939	283,417
Bobcat	3,970,766	(27,947)	3,942,819	459,050
Subtotal	10,255,395	(2,525,287)	7,730,108	848,127
Consolidation adjustments	(2,525,287)	2,525,287	-	-
Total	₩ 7,730,108	₩ -	₩ 7,730,108	₩ 848,127

(2) Segment assets at December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019	2018
EG	₩ 915,003	₩ 876,240
CE	2,924,196	2,855,525
Bobcat	6,704,236	6,446,324
Other	4,096,999	4,064,449
Subtotal	14,640,434	14,242,538
Consolidation adjustments	(3,301,841)	(3,213,371)
Total	₩ 11,338,593	₩ 11,029,167

(3) Segment liabilities as at December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019	2018
EG	₩ 730,703	₩ 739,512
CE	3,570,184	3,623,061
Bobcat	2,725,170	2,706,721
Other	1,122,334	1,162,823
Subtotal	8,148,391	8,232,117
Consolidation adjustments	(1,077,350)	(1,023,765)
Total	₩ 7,071,041	₩ 7,208,352

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(4) The sales information by regional segment for the years ended December 31, 2019 and 2018, is as follows:

(in millions of Korean won)

	Total revenue			
	2019		2018	
Asia Pacific & Emerging Market	₩	3,585,178	₩	3,345,009
China		1,475,915		1,486,004
Europe & Middle East & Africa		1,963,715		1,813,731
North America & Oceania		4,022,573		3,610,651
Subtotal		11,047,381		10,255,395
Consolidation adjustments		(2,861,541)		(2,525,287)
Total	₩	8,185,840	₩	7,730,108

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25. Revenue

The Group has recognized the following amounts relating to revenue in the statement of profit or loss:

<i>(in millions of Korean won)</i>	2019
1. Revenue from contracts with customers	
Type of revenue:	
- Revenue of manufactured products / merchandise	₩ 8,006,653
- Other revenue	127,118
Subtotal	₩ 8,133,771
Timing of revenue recognition:	
- At a point in time	₩ 7,900,244
- Over time	233,527
Subtotal	₩ 8,133,771
2. Revenue from other sources	
- Rental income	₩ 64,499
- profit or loss from hedge	(12,430)
Subtotal	₩ 52,069
Total	₩ 8,185,840

<i>(in millions of Korean won)</i>	2018
1. Revenue from contracts with customers	
Type of revenue:	
- Revenue of manufactured products / merchandise	₩ 7,630,668
- Other revenue	49,605
Subtotal	₩ 7,680,273
Timing of revenue recognition:	
- At a point in time	₩ 7,552,474
- Over time	127,799
Subtotal	₩ 7,680,273
2. Revenue from other sources	
- Rental income	₩ 51,581
- profit or loss from hedge	(1,746)
Subtotal	₩ 49,835
Total	₩ 7,730,108

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(2) Assets and Liabilities related to Contracts with Customers

The Group has recognized the following assets and liabilities related to contracts with customers:

<i>(in millions of Korean won)</i>	2019	
Contract assets - shipping•insurance service	₩	2,517
Total contract assets	₩	2,517
Contract liabilities – return liabilities	₩	14,099
Contract liabilities – product warranties/Incentive and others		412,026
Contract liabilities – shipping•insurance service		2,517
Total contract liabilities	₩	428,642

<i>(in millions of Korean won)</i>	2018	
Contract assets - shipping•insurance service	₩	4,481
Total contract assets	₩	4,481
Contract liabilities – return liabilities	₩	21,833
Contract liabilities – product warranties/Incentive and others		351,211
Contract liabilities – shipping•insurance service		4,481
Total contract liabilities	₩	377,525

26. Breakdown of Expenses by Nature

Breakdown of Expenses by Nature for the years ended December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	2019		2018	
Purchases of inventories (raw materials and merchandise)	₩	4,440,827	₩	4,244,171
Changes in inventories		(271,611)		(273,853)
Employee benefits expenses		867,311		765,983
Depreciation and amortization		248,761		240,255
Other expenses		2,060,155		1,905,424
Total	₩	7,345,443	₩	6,881,980

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27. Selling and Administrative Expenses

Selling and administrative expenses for the years ended December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	2019		2018	
Salaries	₩	289,411	₩	248,394
Post-employment benefits		18,198		20,318
Employee benefits		59,906		55,377
Printing		4,212		1,765
Freight and custody		2,094		2,863
Communications		9,633		7,595
Utilities		4,643		4,684
Maintenance		3,817		3,263
Insurance		18,652		15,419
Depreciation		17,527		13,489
Right of use asset depreciation		14,784		-
Amortization		24,825		30,505
Research and development		190,235		152,876
Advertising expenses		79,751		58,518
Sales commission		70,043		75,021
Taxes and dues		13,008		10,897
Travel expenses		37,231		35,265
Commission expenses		151,330		132,139
Education and training expenses		10,265		4,872
Bad debt expenses (reversal)		(7,984)		3,514
Others		60,643		68,960
Total	₩	1,072,224	₩	945,734

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28. Finance Income and Expenses

Finance income and expenses for the years ended December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018	
Finance income:				
Interest income	₩	19,832	₩	14,872
Gain on dividends		12,982		4,266
Gain on foreign currency transactions		64,847		43,974
Gain on foreign currency translations		45,044		29,117
Gain on derivative transactions		5,840		5,164
Gain on valuation of derivatives		-		6,221
Gain on debt redemption		1,767		-
Financial guarantee income		279		639
Subtotal	₩	150,591	₩	104,253
Finance expenses:				
Interest expenses	₩	(192,022)	₩	(196,306)
Loss on foreign currency transactions		(58,524)		(38,855)
Loss on foreign currency translations		(54,815)		(55,503)
Loss on derivative transactions		(11,789)		-
Loss on repayment of borrowings		(2,168)		(1,985)
Financial guarantee expenses		(10,519)		(9,975)
Other finance expenses		(539)		(715)
Subtotal	₩	(330,376)	₩	(303,339)
Net finance expenses	₩	(179,785)	₩	(199,086)

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29. Other non-operating Income and Expenses

Other non-operating income and expenses for the years ended December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

	2019		2018
Other non-operating income:			
Rental income	₩ -	₩	39
Gain on disposal of short-term investment securities	-		1,227
Gain on valuation of short-term investment securities	8		8
Gain on disposal of long-term investment securities	-		197
Gain on disposal of property, plant and equipment	364		713
Reversal of impairment loss on property, plant and equipment	-		18
Gain on disposal of intangible assets	-		65
Gain on disposal of other non-current assets	-		588
Others	13,564		33,229
Subtotal	₩ 13,936	₩	36,084
Other non-operating expenses:			
Loss on disposal of trade receivables	₩ (14,333)	₩	(11,900)
Loss on valuation of short-term investment securities	(3,200)		(120)
Loss on valuation of long-term investment securities	(482)		-
Loss on disposal of other investment securities	(1,141)		-
Reversal of impairment loss on other receivables (expense)	(7,162)		2,195
Loss on disposal of property, plant and equipment	(4,164)		(4,590)
Impairment loss on property, plant and equipment	(64)		(2,054)
Impairment loss on intangible assets	(5,587)		(16,117)
Impairment loss on investment properties	(57)		(504)
Donations	(11,445)		(10,840)
Others	(16,202)		(19,767)
Subtotal	₩ (63,837)	₩	(63,697)
Total	₩ (49,901)	₩	(27,613)

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30. Income Tax Expense

(1) Income tax expense for the years ended December 31, 2019 and 2018, consists of

<i>(in millions of Korean won)</i>	2019		2018	
Current tax:	₩	91,183	₩	64,223
Deferred tax		87,321		156,051
Total income tax expense	₩	178,504	₩	220,274
Deferred tax charged directly to equity		28,807		1,983
Income tax expense	₩	207,311	₩	222,257

(2) The Group offsets deferred tax assets and deferred tax liabilities if the Group has a legally enforceable right to set off current tax assets against current tax liabilities and the deferred tax assets and the deferred tax liabilities relate to income taxes levied by the same taxation authority. Changes in deferred tax assets and liabilities for the years ended December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	2019		
	Beginning	Increases(Decreases)	Ending
Advances from government	₩ 1,230	₩ (161)	₩ 1,069
Allowance for doubtful accounts	80,595	(12,620)	67,975
Provision for product warranties	24,768	28,318	53,086
Net defined benefit liabilities	96,968	3,601	100,569
Investment in associates	(19,195)	1,004	(18,191)
Provision for temporary depreciation	(3,715)	-	(3,715)
Gain on revaluation of land	(118,291)	(5,312)	(123,603)
Derivative assets(liabilities)	1,713	(2,455)	(742)
Net loss carryforwards	10,088	1,833	11,921
Others	(72,677)	(101,529)	(174,206)
Total	₩ 1,484	₩ (87,321)	₩ (85,837)

<i>(in millions of Korean won)</i>	2018		
	Beginning	Increases(Decreases)	Ending
Advances from government	₩ 1,391	₩ (161)	₩ 1,230
Allowance for doubtful accounts	114,549	(33,954)	80,595
Provision for product warranties	22,573	2,195	24,768
Net defined benefit liabilities	109,457	(12,489)	96,968
Investment in associates	(19,112)	(83)	(19,195)
Provision for temporary depreciation	(3,734)	19	(3,715)
Reserve for research and development	(8,874)	8,874	-
Gain on revaluation of land	(121,319)	3,028	(118,291)
Derivative assets(liabilities)	868	845	1,713
Net loss carryforwards	7,411	2,677	10,088
Others	54,325	(127,002)	(72,677)
Total	₩ 157,535	₩ (156,051)	₩ 1,484

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(3) Temporary differences which have not been recognized as deferred tax assets as at December 31, 2019 and 2018, are as follows (except for investments in subsidiaries and associates):

<i>(in millions of Korean won)</i>	2019		2018	
Tax loss carryforwards	₩	945,199	₩	1,491,960
Deductible temporary differences		212,647		229,095
Tax credits carryover		20,934		19,189

The probability of deferred tax assets being realized depends on the Group's ability to generate taxable income in future years, the economic situation and industry forecast. The Group periodically reviews such matters.

(4) Temporary differences from investments in subsidiaries, joint ventures and associates, which are not recognized as deferred tax assets (liabilities) are as follows:

<i>(in millions of Korean won)</i>	2019		2018	
Subsidiaries	₩	(609,680)	₩	(262,828)

(5) The tax on the Group's profit before tax differs from the theoretical amount that would arise using the weighted average tax rate applicable to profits of the consolidated entities as follows:

<i>(in millions of Korean won)</i>	2019		2018	
Profit before income tax expense	₩	603,009	₩	616,426
Tax at domestic tax rates applicable to profits in the respective countries	₩	198,349	₩	162,491
Adjustment:				
Non-temporary difference		13,371		9,253
Effect of change in recognition of deferred income tax		(2,985)		(6,939)
Tax credits		(38,088)		(9,012)
Additional income tax and tax refund for prior periods		2,913		(7,949)
Others		33,751		74,413
Income tax expense	₩	207,311	₩	222,257
Average effective tax rate (Income tax expense / Profit before income tax)		34.4%		36.1%

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31. Earnings per Share

(1) Basic earnings per share

Basic earnings per share is calculated by dividing the profit attributable to owners of the Group by the weighted average number of ordinary shares outstanding during the financial year excluding treasury shares.

Basic earnings per share attributable to owners of the Group for the years ended December 31, 2019 and 2018, are computed as follows:

<i>(in Korean won, shares)</i>	2019	2018
Profit attributable to the ordinary equity holders of the Parent Company	₩ 239,913,446,929	₩ 246,409,919,128
Weighted average number of ordinary shares outstanding ¹	208,160,644	208,143,428
Basic earnings per share	₩ 1,153	₩ 1,184

¹ The weighted average number of ordinary shares outstanding is calculated as follows:

<i>(in shares)</i>	2019	2018
Ordinary shares at the beginning	208,157,572	207,999,614
Exercise of stock warrants	3,072	143,814
Weighted average number of ordinary shares outstanding	208,160,644	208,143,428

(2) Diluted earnings per share

Diluted earnings per share for the years ended December 31, 2019 and 2018, are computed as follows.

<i>(in Korean won, shares)</i>	2019	2018
Profit attributable to ordinary shares before adjustment	₩ 239,913,446,929	₩ 246,409,919,128
Adjustment:	-	-
Profit attributable to ordinary shares after adjustment	239,913,446,929	246,409,919,128
Weighted average number of ordinary shares outstanding after adjustment ¹	210,607,775	220,950,731
Diluted earnings per share	₩ 1,139	₩ 1,115

¹ The details of weighted-average number of ordinary shares outstanding after adjustment used to calculate diluted earnings per share are as follows:

<i>(in shares)</i>	2019	2018
Ordinary shares at the beginning	208,160,644	208,143,428
Exercise of stock warrants	2,447,131	12,807,303
Weighted average number of Ordinary shares outstanding	210,607,775	220,950,731

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Share options that could be used to dilute basic earnings per share in the future, which were not considered in the calculation of diluted earnings per share due to an anti-dilutive effect for the years ended December 31, 2019 and 2018, are as follows

<i>(in shares)</i>	2019	2018
Share options	184,800	211,320

32. Dividends

The Group did not pay any dividends for the year ended December 31, 2019

33. Commitments and Contingencies

(1) Pending litigations

As at December 31, 2019, the Group is involved in pending lawsuits as a defendant with total claims amounting to ₩ 756,544 million. The outcome of the lawsuit and its effects cannot be reasonably estimated as at December 31, 2019.

In 2011, an external investor acquired 20% of interest in Doosan Infracore China Co., Ltd., a subsidiary of the Parent Company, for ₩ 380 billion. According to the shareholders' agreement entered into with the Parent Company, both parties have the right to request the counterparty to jointly sell their respective shares to a third party. Although, in principal, the Parent Company has to jointly sell its stake in case the external investor request for such sale, the Parent Company also has the right to purchase the external investor's share first at the price proposed by the external investor.

In 2014, the external investor requested for due diligence information to initiate its sale of shares. However, as the potential buyer was not confirmed yet, the Parent Company could not provide such information which included confidential proprietary information. The external investor filed a claim to the Seoul Central District Court to obtain the due diligence information but it was dismissed on March 2, 2015 based on the ruling that the Parent Company was not obligated to provide such information to the external investor.

In November 2015, the external investor filed a lawsuit claiming partial payment of stock purchase price (i.e. ₩ 10 billion among ₩ 709.3 billion) contending that a share purchase agreement shall be deemed to be executed following the Group's purported failure to cooperate with the external investor's request for due diligence information. The external investor's claim was dismissed at the first ruling on January 12, 2017 stating that the Group did not breach its obligation to cooperate with the external investor's sale of its shares. However, on February 21, 2018 the Seoul High Court overturned the 1st ruling and recognized the Parent Company's breach of duty and ruled the Company to pay the claim amount of ₩ 10 billion.

The Parent Company appealed against the 2nd ruling and took it to the Supreme Court on February 26, 2018. The Seoul High Court, on February 28 2018, ruled that the Group's application for suspension of enforcement was valid and suspended the 2nd ruling's court order of payment.

Meanwhile, an external investor filed an additional lawsuit about the remaining stock purchase price as at March 2018 (the aggregate amount of ₩ 705.1 billion) and the lawsuit is pending as at December 31, 2019.

As a preservation procedure of the ongoing lawsuit, the Group pledged 8,288,196 ordinary shares of Doosan Bobcat Inc., to the external investor and payed an extra payment of ₩ 10 billion, according to the court's recommendation to settle which was issued by Seoul Central District Court on July 2018. If the Group wins the case at the Supreme Court, the pledge as collateral will be terminated and the external investor will be obliged to repay the extra payment to the Group.

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(2) As at December 31, 2019, the Group has entered into bank overdraft agreements amounting to ₩ 2,630,020 million with various financial institutions.

(3) Financial covenant

As at December 31, 2019, the Group issued 32nd and 57th series bonds denominated in USD 300 million, respectively. In accordance with the agreement for issuing the 32nd and 57th series bonds, an early redemption clause exists for when and if the Group's guarantor, the Korea Development Bank, becomes privatized. In addition, the Group has pledged its 11,533,388 and 11,362,886 shares of Doosan Bobcat Inc. as collaterals and, if the price falls below par, additional shares or deposits equivalent to the difference should be secured.

The Group has pledged 16,341,780 shares of Doosan Bobcat Inc. as collateral for borrowings of ₩ 350,000 million from the Korea Development Bank and 8 other financial institutions. In relation to the borrowings, if the ratio does not meet the certain collateral limit predetermined in the agreement, additional shares or deposits must be secured as collaterals. Also, in case the Group receives a credit rating equal to or lower than BB0 from more than two of the domestic credit rating agencies, NICE Investors Service Co., Ltd., Korea Investor Service Inc., and Korea Ratings Corporation, it will be a trigger for the financial institutions to collect the loans before the maturity. As at December 31, 2019, the Group issued 43rd series bonds denominated in ₩ 50,000 million, in case the Group receives a credit rating equal to or lower than BB+ from more than one of the domestic credit rating agencies such as NICE Investors Service Co., Ltd., Korea Investor Service Inc., and Korea Ratings Corporation, it will be a trigger for the financial institutions to collect the bonds before the maturity.

The Group has pledged 3,650,000 shares of Doosan Bobcat Inc. as collateral for borrowings of ₩ 100,000 million from Standard Chartered Bank Korea Ltd. In relation to the borrowings, if the ratio does not meet the certain collateral limit predetermined in the agreement, either shares or deposits must be additionally secured as collaterals or some loans must be redeemed early.

(4) The financial liabilities related to the transferred receivables that the Group continues to recognize because the Group substantially retains all of the risks and rewards of ownership as at December 31, 2019, amount to ₩ 10,013 million.

(5) As at December 31, 2019, guarantees provided by the Group for third parties are as follows:

(in thousands of foreign currencies and millions of Korean won)

Guarantor	Beneficiary		Guaranteed amount		Korean won equivalent
Doosan Infracore China Co., Ltd.	End User	CNY	414,571	₩	68,711
Clark Equipment Co. and others	End User	USD	124,244		143,850
Doosan Bobcat EMEA s.r.o. and others	End User	USD	1,132		1,310
Doosan Bobcat Korea Co., Ltd.	End User	USD	5,426		6,283
Total				₩	220,154

Meanwhile, as at December 31, 2019, the Group entered into agreements with the Korea Development Bank for the guarantees of 32nd and 57th foreign currency-denominated bonds of USD 300,000 thousand respectively. In addition, the company entered into agreements with various banks for performance guarantees of USD 204 thousand regarding exports and imports, and with Seoul Guarantee Insurance Company and Machinery Financial Cooperative for performance and payment guarantees of ₩ 14,452 million in total. Regarding guarantees provided by Machinery Financial Cooperative, equity investment of ₩ 200 million in Machinery Financial Cooperative is also pledged as a collateral.

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(6) Other commitments and contingencies

During the year ended December 31, 2019, the Group entered into an investment contracts with ZIGG CAPITAL I,L.P, amounting to USD 5,000 thousand and Caffeinated Capital Opportunity Fund II, LP amounting to USD 2,000 thousand.

During the year ended December 31, 2018, the Group entered into a lease contract of the Doosan Bundang Center (tentative) with the DBC Co., Ltd. for 15 years from the lease start date.

During the year ended December 31, 2018, the Group entered into an investment contracts with Nautilus Venture Partners Fund II, L.P. and ICONIQ Strategic Partners IV-B, LP. The contracts amount to USD 10,000 thousand and USD 3,000 thousand, respectively.

34. Pledged Assets

(1) The Group's assets pledged as collaterals for long-term and short-term borrowings as at December 31, 2019, are as follows:

in thousand of USD , in millions of Korean won)

Pledgee	Collateralized asset	Amount of Borrowings		Collateralized amount	
		KRW	198,000	KRW	371,112
Korea Development Bank	Land, buildings and machinery ¹	USD	15,000	USD	95,025
				DM	84,000
Korea Exim Bank	Inventories	KRW	80,000	KRW	195,000
Ubest 5th Co.,Ltd	Land and buildings, etc.	KRW	80,000	KRW	96,000
Innovation Norge and others	Buildings and machinery etc	NOK	13,270	NOK	77,427

¹ The Parent Company's rights to property and inventory insurance benefits are pledged as collaterals to the Korea Development Bank.

(2) The Group's subsidiary, Clark Equipment Co., repaid the borrowings, borrowed on May 28, 2014 in conjunction with Doosan Holdings Europe Ltd., in full, and entered into a new borrowing of USD 1,345,000 thousand and a limit loan agreement of USD 150,000 thousand, on May 18, 2017. The Group has pledged total shares of Clark Equipment Co., Doosan Bobcat EMEA s.r.o, and Doosan Bobcat Singapore Pte. Ltd., as collaterals for the borrowing and loan commitment. Also, Clark Equipment's certain tangible assets, intangible assets, equity share and etc are provided as collateral. The related borrowings as at December 31, 2019 is USD 657,013 thousand.

(3) The Group's associate, DBC Co., Ltd. has entered to a PF loan agreement amounting to ₩ 375,000 million for construction of the Doosan Bundang Center. In relation to the borrowings, the Group has pledged 1,057,880 shares of DBC Co, Ltd. held by the Group as a collateral (secured amount ₩ 53,066 million).

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35. Related Party Transactions

The Group's related party disclosures for the years ended December 31, 2019 and 2018, are as follows:

(1) Nature of relationship

Relationship	Name
Ultimate parent	Doosan Corporation
Next most senior parent	Doosan Heavy Industries and Construction Co., Ltd.
Joint ventures and associates	Doosan Cuvex Co., Ltd., DBC Co., Ltd., Doosan PSI LLC, Doosan Infracore Liaoning Machinery Sales Co., Ltd., Tianjin Lovol Doosan Engine Co., Ltd., and others
Other related parties ¹	Doosan Construction & Engineering Co., Ltd., Oricom Inc., Doosan Bears Inc., Neoplux Co., Ltd. and others

¹ Other related parties include entities which belong to a large enterprise group in accordance with the Monopoly Regulation and Fair Trade Act, although the entities are not the related party of the Group in accordance with Korean IFRS 1024.

(2) Significant transactions with related parties for the years ended December 31, 2019 and 2018, are as follows

(in millions of Korean won)

Relationship	2019						
	Sales	Disposal of property, plant and equipment and intangible assets	Other income	Purchases	Acquisition of property, plant and equipment and intangible assets	Other expenses	Acquisition Right of use asset
Ultimate parent	₩ 70,567	₩ 2	₩ 6	₩ 82,226	₩ 53,324	₩ 52,321	₩ 5,285
Next most senior parent	1,602	-	-	-	39,525	1	-
Joint ventures and associates	37	-	134	167	-	10,694	-
Others	1,173	-	2,289	1	15,864	100,989	1,828
Total	₩ 73,379	₩ 2	₩ 2,429	₩ 82,394	₩ 108,713	₩ 164,005	₩ 7,113

(in millions of Korean won)

Relationship	2018						
	Sales	Disposal of property, plant and equipment and intangible assets	Other income	Purchases	Acquisition of property, plant and equipment and intangible assets	Other expenses	
Ultimate parent	₩ 61,884	₩ 70	₩ -	₩ 87,891	₩ 3,570	₩ 50,394	
Next most senior parent	769	-	-	-	136	4	
Joint ventures and associates	43	-	6,148	118	-	9,022	
Others	609	-	4,094	3,157	2,150	85,453	
Total	₩ 63,305	₩ 70	₩ 10,242	₩ 91,166	₩ 5,856	₩ 144,873	

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(3) Outstanding balances of significant receivables and payables for related parties as at December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

Relationship	2019				
	Trade receivables	Other receivables	Trade payables	Other payables	Lease liabilities
Ultimate parent	₩ 11,269	₩ 4,575	₩ 7,057	₩ 10,365	₩ 5,285
Next most senior parent	102	76	-	1,078	-
Joint ventures and associates	-	4,526	-	725	-
Others	312	15,122	3,443	5,962	1,864
Total	₩ 11,683	₩ 24,299	₩ 10,500	₩ 18,130	₩ 7,149

(in millions of Korean won)

Relationship	2018			
	Trade receivables	Other receivables	Trade payables	Other payables
Ultimate parent	₩ 4,139	₩ 4,751	₩ 7,950	₩ 7,746
Next most senior parent	-	72	-	482
Joint ventures and associates	-	4,317	92	399
Others	23	32,119	2,392	5,659
Total	₩ 4,162	₩ 41,259	₩ 10,434	₩ 14,286

(4) Fund transactions (including equity transactions) with related parties for the years ended December 31, 2019 and 2018, are as follows:

(in millions of Korean won)

		2019			
		Loan transaction		Equity transaction	Dividends
		Lending	Repayment	Contribution	Income
Next most-senior parent	Doosan Heavy Industries and Construction Co., Ltd.	₩ -	₩ -	₩ -	₩ 12,640
Associate and joint ventures	Tianjin Lovol Doosan Engine Co., Ltd.	-	-	12,913	-
	DBC Co., Ltd. ¹	-	-	28,474	-
Others	Doosan Heavy Industries America Holdings INC.	93,252	93,252	-	-
Total		₩ 93,252	₩ 93,252	₩ 41,387	₩ 12,640

¹ The Group acquired certain portion of interest in DBC Co., Ltd. originally held by the related parties. It purchased ₩ 23,096 million of shares from Doosan Heavy Industries and Construction Co., Ltd., the next most senior parent, and ₩ 5,378 million of shares from Doosan Construction & Engineering Co., Ltd., one of other related parties, respectively.

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		2018			
		Equity Transactions		Dividends	
		Contribution	Capital reduction	Income	Payment
Next most-senior parent	Doosan Heavy Industries and Construction Co., Ltd.	₩ -	₩ -	₩ 3,108	₩ 4,231
	Tianjin Lovol Doosan Engine Co., Ltd	12,727	-	-	-
Associate and joint ventures	Potenit Co., Ltd. .	5,333	-	-	-
	DBC Co., Ltd.	-	36,424	-	-
Others	Doosan Engine Co., Ltd.	-	-	-	8,462
	Total	₩ 18,060	₩ 36,424	₩ 3,108	₩ 12,693

(5) The Group's lease contracts with related parties amount to ₩ 7,113 million, and lease payments to related parties amount to ₩ 1,153 million.

(6) Details of collaterals provided by and provided to the related parties as at December 31, 2019 are described in Note 34.

(7) The Group defines key management personnel including registered officer and non-registered officer who have the authority and responsibility for planning, operation and control. Compensation to the key management personnel of the Group for the years ended December 31, 2019 and 2018, is as follows:

(in millions of Korean won)

	2019	2018
Employee benefits	₩ 26,757	₩ 23,879
Post-employment benefits	1,246	1,179
Total	₩ 28,003	₩ 25,058

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36. Consolidated Statements of Cash Flows

(1) Details of adjustments, and changes in operating assets and liabilities in the consolidated statement of cash flows for the years ended December 31, 2019 and 2018, are as follows

(in millions of Korean won)

	2019		2018	
Adjustments:				
1. Income tax expense	₩	207,311	₩	222,257
2. Finance income		(39,449)		(31,596)
3. Finance expenses		228,808		224,398
4. Post-employment benefits (defined benefit plan)		44,849		47,154
5. Depreciation		147,778		142,317
6. Amortization		76,970		97,938
7. Right of use asset depreciation		24,013		-
8. Gain on disposal of property, plant and equipment		(364)		(713)
9. Gain on disposal of intangible assets		-		(65)
10. Loss on disposal of property, plant and equipment		4,164		4,590
11. Loss on disposal of intangible assets		1,141		-
12. Reversal of impairment loss on property, plant and equipment		-		(18)
13. Impairment loss on property, plant and equipment		64		2,054
14. Impairment loss on intangible assets		5,587		16,117
15. Impairment loss on investment properties		57		504
16. Gain on valuation of short-term investment securities		(8)		-
17. Loss on valuation of short-term investment securities		3,682		120
18. Gain on equity method investments		7,702		5,002
19. Dividend income		(12,982)		(4,266)
20. Others		222		5,374
Total	₩	699,545	₩	731,167

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<i>(in millions of Korean won)</i>	2019		2018	
Changes in operating assets and liabilities:				
1. Changes in trade receivables	₩	58,419	₩	(84,096)
2. Changes in other receivables		3,268		7,946
3. Changes in derivative assets		775		(2,389)
4. Changes in inventories		(243,179)		(252,531)
5. Changes in other current assets		3,881		(48,183)
6. Changes in other non-current assets		(4,229)		2,420
7. Changes in trade payables		(157,692)		116,879
8. Changes in other payables		80,622		157,364
9. Changes in derivative liabilities		(10,746)		(29,306)
10. Changes in provisions		89,349		3,954
11. Changes in other current liabilities		(5,975)		91,883
12. Payment of defined benefit obligations (defined benefit plan)		(145,254)		(48,810)
13. Transferred out to affiliates		1,508		704
14. Changes in plan assets		54,665		(11,439)
15. Changes in other non-current liabilities		(4,757)		13,555
Total	₩	(279,345)	₩	(82,049)

(2) Significant non-cash transactions for the years ended December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	2019		2018	
Non-trade payables related to property, plant and equipment acquisition	₩	(570)	₩	19,131

(3) Changes in liabilities arising from financial activities for the years ended December 31, 2019 and 2018, are as follows:

<i>(in millions of Korean won)</i>	2019						
	Beginning balance	Cash flows	Non-cash variances			Ending balance	
			Changes in exchange rates	Changes in fair value	Others		
Short-term borrowings	₩ 937,600	₩ (349,801)	₩ 3,284	₩ -	₩ -	₩ 591,083	
Long-term borrowings (including current portion of long-term borrowings)	1,881,810	(579,988)	59,584	4,711	6,267	1,372,384	
Bonds (including current portion of bonds)	983,221	448,616	9,360	5,883	-	1,447,080	
Bonds with warrants	466,179	4	-	26,830	(21)	492,992	
Lease liabilities	-	(21,423)	499	-	100,330	79,406	
Liabilities to avoid risks arising from bonds	1,756	6,781	(9,998)	(8,214)	(3,095)	(12,770)	
Total	₩ 4,270,566	₩ (495,811)	₩ 62,729	₩ 29,210	₩ 103,481	₩ 3,970,175	

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	2018						
	Beginning balance	Cash flows	Non-cash variances			Ending balance	
			Changes in exchange rates	Changes in fair value	Others		
Short-term borrowings	₩ 1,409,287	₩ (478,613)	₩ 6,926	₩ -	₩ -	₩ 937,600	
Long-term borrowings (including current portion of long-term borrowings)	1,610,116	207,196	59,880	2,633	1,985	1,881,810	
Bonds (including current portion of bonds)	1,187,175	(238,264)	28,020	6,305	(15)	983,221	
Bonds with warrants	442,423	85	-	25,087	(1,416)	466,179	
Liabilities to avoid risks arising from bonds	33,656	-	(28,020)	4,597	(8,477)	1,756	
Total	₩ 4,682,657	₩ (509,596)	₩ 66,806	₩ 38,622	₩ (7,923)	₩ 4,270,566	

37. Changes in Accounting Policies

(1) Adoption of Korean IFRS 1116 Lease

As explained in Note 2.1.1, the Group has adopted Korean IFRS 1116, retrospectively, from January 1, 2019, but has not restated comparatives for the 2018 reporting period, as permitted under the specific transitional provisions in the standard. The reclassifications and the adjustments arising from the new leasing rules are, therefore, recognized in the consolidated statement of financial position on January 1, 2019.

(2) Adjustments recognized on adoption of Korean IFRS 1116 Lease

On adoption of Korean IFRS 1116, the Group recognized lease liabilities in relation to leases which had previously been classified as 'operating leases' under the principles of Korean IFRS 1017. These liabilities were measured at the present value of the remaining lease payments, discounted using the lessee's incremental borrowing rate as at January 1, 2019. The lessee's incremental borrowing rate applied to the lease liabilities on January 1, 2019 was 3.71~5.97%.

(in millions of Korean won)

	2019
Operating lease commitments disclosed as at December 31, 2018	₩ 83,200
Discounted using the lessee's incremental borrowing rate of at the date of initial application	73,272
Less: short-term leases not recognized as a liability	(7,146)
Add/(Less): adjustments as a result of a different treatment of extension and termination options	374
Lease liability recognized as at January 1, 2019	66,500
Current lease liabilities	15,282
Non-current lease liabilities	51,218
Total	₩ 66,500

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① Amounts recognized in the consolidated statements of financial position

The consolidated statements of financial position shows the following amounts relating to leases:

<i>(in millions of Korean won)</i>	December 31, 2019		January 1, 2019	
Right-of-use assets				
Land	₩	17,810	₩	17,972
Buildings		63,965		52,851
Machinery		1,236		1,882
Vehicles		8,576		6,597
Tools		19		25
Equipment		4,071		4,927
Total	₩	<u>95,677</u>	₩	<u>84,254</u>
<i>(in millions of Korean won)</i>		December 31, 2019		January 1, 2019
Lease liabilities				
Current	₩	28,226	₩	15,282
Non-current		51,180		51,218
Total	₩	<u>79,406</u>	₩	<u>66,500</u>

② Amounts recognized in the consolidated statements of profit or loss

The consolidated statements of profit or loss shows the following amounts relating to leases:

<i>(in millions of Korean won)</i>	2019	
Depreciation of right-of-use assets		
Land	₩	772
Buildings		15,889
Machinery		743
Vehicles		4,374
Tools		8
Equipment		2,227
Total	₩	<u>24,013</u>
Interest expense relating to lease liabilities	₩	3,326
Expense relating to short-term leases and leases of low-value assets		12,144

The total cash outflow for leases in 2019 are as follows:

<i>(in millions of Korean won)</i>	2019	
Lease liabilities	₩	24,749
Expense relating to short-term leases and leases of low-value assets		12,144
Total	₩	<u>36,893</u>

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The change in accounting policy affected the following items in the consolidated statement of financial position on January 1, 2019:

- right-of-use assets: increase by ₩ 84,254 million(Transfer of long-term prepaid expenses to right-of-use assets: Transfer of ₩ 17,754 million)
- lease liabilities: increase by ₩ 66,500 million

③ Practical expedients applied

In applying Korean IFRS 1116 for the first time, the Group has used the following practical expedients permitted by the standard:

- use of a single discount rate to a portfolio of leases with reasonably similar characteristics
- reliance on previous assessments on whether leases are onerous
- accounting for operating leases with a remaining lease term of less than 12 months as at January 1, 2019, as short-term leases
- exclusion of initial direct costs for the measurement of the right-of-use asset at the date of initial application, and
- use of hindsight in determining the lease term where the contract contains options to extend or terminate the lease

The Group has also elected not to reassess whether a contract is, or contains a lease at the date of initial application. Instead, for contracts entered into before the transition date, the Group relied on its assessment made applying Korean IFRS 1017 and Interpretation 2104 *Determining whether an Arrangement contains a Lease*.

(3) The Group's leasing activities and how these are accounted for

Until the 2018 financial year, leases of property, plant and equipment were classified as operating leases. Payments made under operating leases (net of any incentives received from the lessor) were charged to profit or loss on a straight-line basis over the period of the lease.

From January 1, 2019, leases are recognized as a right-of-use asset and a corresponding liability at the date at which the leased asset is available for use by the Group. Each lease payment is allocated between the liability and finance cost. The finance cost is charged to profit or loss over the lease period so as to produce a constant periodic rate of interest on the remaining balance of the liability for each period. The right-of-use asset is depreciated over the shorter of the asset's useful life and the lease term on a straight-line basis.

Assets and liabilities arising from a lease are initially measured on a present value basis. Lease liabilities include the net present value of the following lease payments:

- fixed payments (including in-substance fixed payments), less any lease incentives receivable
- variable lease payment that are based on an index or a rate
- amounts expected to be payable by the lessee under residual value guarantees
- the exercise price of a purchase option if the lessee is reasonably certain to exercise that option, and

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- payments of penalties for terminating the lease, if the lease term reflects the lessee exercising that option

The lease payments are discounted using the interest rate implicit in the lease. If that rate cannot be determined, the lessee's incremental borrowing rate is used, being the rate that the lessee would have to pay to borrow the funds necessary to obtain an asset of similar value in a similar economic environment with similar terms and conditions.

Right-of-use assets are measured at cost comprising the following:

- the amount of the initial measurement of lease liability
- any lease payments made at or before the commencement date less any lease incentives received
- any initial direct costs, and
- restoration costs

Payments associated with short-term leases and leases of low-value assets are recognized on a straight-line basis as an expense in profit or loss.

38. Business Combination

(1) ZTR Mowers Segment

1) Upon approval of board of directors on December 2, 2019, Group acquired the ZTR Mowers business of Schiller Grounds Care, INC's on December 31, 2019. The Group expects a synergy effect between ZTR Mowers business and its existing business in the US as a result of this acquisition.

2) The Goodwill of ₩ 23,646 million is based on and synergy effect as mentioned above.

3) The amount of assets and liabilities acquired on the acquisition date is measured at fair value. The consideration paid to Schiller Grounds Care, INC and the acquired assets and liabilities recognized on the acquisition date are as follows.

(in millions of Korean won)

1. Consideration transferred		
Cash	₩	94,347
Tax liabilities		2,141
2. Recognized amounts of identifiable assets acquired and liabilities assumed		
Trade receivables and others	₩	4,601
Inventories		20,993
Other current assets		164
Property plant and equipment ¹		10,461
Intangible assets ²		49,439
Trade payable and other payables		(3,558)
Other current liabilities		(5,414)
Other non-current liabilities		(3,844)
Fair value of identifiable net assets		72,842
3. Goodwill ³	₩	23,646

¹ The group, as at December 31, 2019 has not completed a fair value evaluation of property, plant and equipment.

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² Intangible assets include identifiable right of trademark which amounts to ₩ 31,829 million.

³ The Group, as at December 31, 2019 has not completed a fair value evaluation of property, plant and equipment, which may result in changes in the amount of Goodwill.

4) The Group supposed acquisition occurred at December 31, 2019 and therefore Mower's revenue and net income are not included in consolidated statements of comprehensive income.

5) The revenue and profit or loss that would have been included in the consolidated statements of comprehensive income were ₩ 96,956 million, ₩ 4,077 million, respectively, in the assumption that Mower business was acquired on January 1, 2019.