SAMSUNG SDS

SAMSUNG SDS CO., LTD.
AND ITS SUBSIDIARIES

CONSOLIDATED FINANCIAL STATEMENTS
AS OF AND FOR THE YEARS ENDED
DECEMBER 31, 2019 AND 2018

ATTACHMENT: INDEPENDENT AUDITORS' REPORT

SAMSUNG SDS CO., LTD.

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INDEPENDENT AUDITORS' REPORT

English Translation of Independent Auditors' Report Originally Issued in Korean on March 11, 2020.

To the Shareholders and the Board of Directors of
Samsung SDS Co., Ltd.:

Our Opinion

We have audited the accompanying consolidated financial statements of Samsung SDS Co., Ltd. (the "Company") and its subsidiaries (the "Group"), which comprise the consolidated statements of financial position as of December 31, 2019 and 2018, and the consolidated statements of comprehensive income, consolidated statements of changes in shareholders' equity and consolidated statements of cash flows, all expressed in Korean won, for the years then ended, and a summary of significant accounting policies and other explanatory information.

In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2019 and 2018, and its financial performance and its cash flows for the years then ended in accordance with Korean International Financial Reporting Standards ("K-IFRS").

Basis for Audit Opinion

We conducted our audits in accordance with the Korean Standards on Auditing ("KSAs"). 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, including those related to independence, that are relevant to our audit of the consolidated financial statements in the Republic of Korea as required by prevailing audit regulations. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Key Audit Matter

The key audit matter is the matter that, in our professional judgment, was of most significance in our audit of the consolidated financial statements of the current period. This matters was addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our audit opinion thereon, and we do not provide a separate opinion on this matter.

- Recognition of the gain or loss in accordance with the modification of project

1) Reasons why the matter was determined to be a key audit matter

The Group's information processing system implementation, and software development ('SI sales") revenue is recognized over period. (see Note 2.(7)). For SI sales, changes in scope, period and contract amount may occur upon request from the customer to change the project. The Group's management maintains that in the event of a modification in the project, changes in the estimated total contract cost involved and gain or loss are properly recognized. The Group recognized ₩856,424 million SI sales (15.3% of IT service revenue, see Note 27) in which the project modification occurred during the current period.
SI sales amounts in which the project modification occurred are material to the consolidated financial statements. For these reasons, we determined recognition of the gain or loss in accordance with the modification of project as a key audit matter.

2) How we addressed the Key Audit Matter in our audit procedures

Our audit procedures performed on recognition of the gain or loss in accordance with the modification of project are as follows:

- When changing the terms of the contract, including the amount of the contract. Understand and evaluate the internal control design associated with the recognition of the revenue, and question and review on the documentation for which the process is reviewed by the rightful approver
- Review redetermined contract amount with the supporting documentation, when the modification of project occurred
- Questions and Analytical Reviews on the Reasons when the changes in contract amounts are material
- Review the redetermined estimated total contract cost related to modified project with the supporting documentation and calculation of related gain and loss
- A retrospective review of contracts with the estimated total contract cost and significant changes related to the modified project at the end of the period and after

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

Management is responsible for the preparation of the accompanying consolidated financial statements in accordance with K-IFRS, and for such internal control as they determine 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 of the Group 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, or has no realistic alternative but to do so.

Those charged with governance' responsibilities include 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 auditors' 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 KSAs 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 KSAs, 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, 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 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 Group'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 the 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 auditors' 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 auditors' 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 are solely responsible for our audit opinion.

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

We also provide those charged with governance of the Group with a statement that we have complied with relevant ethical requirements, including those related to independence, and to communicate with them all 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 auditors' report unless law or regulation precludes public disclosure about the matter.

The engagement partner on the audit resulting in this independent auditors' report is Son, Jaeho.

Deloitte Anjin LLC

March 11, 2020

<u>Notice to Readers</u>

This report is effective as of March 11, 2020, the auditors' report date. Certain subsequent events or circumstances may have occurred between the auditors' report date and the time the auditors' report is read. Such events or circumstances could significantly affect the consolidated financial statements and may result in modifications to the auditors' report.

SAMSUNG SDS CO., LTD.
AND ITS SUBSIDIARIES (the "Group")

CONSOLIDATED FINANCIAL STATEMENTS
AS OF AND FOR THE YEARS ENDED
DECEMBER 31, 2019 AND 2018

"The accompanying consolidated financial statements, including all footnote disclosures, were prepared by, and are the responsibility of, the Group."

Hong, Won Pyo

President and Chief Executive Officer
SAMSUNG SDS CO., LTD.

SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

CONSOLIDATED STATEMENTS OF FINANCIAL POSITION

AS OF DECEMBER 31, 2019 AND 2018

	Notes	Korean won December 31, 2019	Korean won December 31, 2018
ASSETS:			
CURRENT ASSETS:			
Cash and cash equivalents	5 and 7	₩ 1,148,183,598,879	₩ 1,161,683,996,643
Short-term financial instruments	6 and 7	2,682,693,917,252	2,510,284,469,888
Trade receivables	7 and 9	1,439,461,740,815	1,291,751,923,940
Other receivables	7, 9,19 and 27	793,950,872,475	705,745,458,041
Prepayments		44,618,326,945	44,176,075,255
Prepaid expenses		71,736,741,862	67,265,138,198
Inventories	10	17,481,715,898	18,774,414,708
Assets classified as held for sale	11	61,548,000,000	-
Other current assets	7 and 9	124,171,820,651	82,094,810,348
Total current assets		6,383,846,734,777	5,881,776,287,021
NON-CURRENT ASSETS:			
Fair value through other comprehensive income (“FVOCI”)	7, 8, 12 and 34	24,599,578,300	22,934,357,054
Fair value through profit or loss (“FVPL”)	7, 8, 12 and 34	7,715,027,675	3,643,123,202
Investments in associates	14	99,432,086,938	43,993,605,770
Property and equipment	4 and 15	1,108,003,641,187	1,068,725,507,567
Right-of-use assets	17	431,232,720,817	-
Intangible assets	4 and 16	789,717,152,634	844,969,106,310
Deposits	7	74,545,964,669	69,754,328,207
Long-term prepaid expenses		1,088,297,509	239,673,339
Deferred tax assets	32	36,398,871,839	34,928,672,689
Other non-current assets	6, 7, 9, 19 and 22	64,655,806,109	42,884,729,555
Total non-current assets		2,637,389,147,677	2,132,073,103,693
Total assets		₩ 9,021,235,882,454	₩ 8,013,849,390,714
LIABILITIES:			
CURRENT LIABILITIES:			
Trade payables	7 and 34	₩ 544,465,103,369	₩ 553,320,727,257
Other payables	7 and 34	73,867,175,567	86,246,212,056
Short-term borrowings	7, 20, 23 and 34	797,510,000	774,724,000
Advances received	27	121,300,591,442	136,026,841,259
Withholdings		15,809,340,448	13,638,047,892
Accrued expenses	7 and 34	572,166,174,706	530,638,197,561
Income tax payable		98,677,695,572	144,206,747,497
Current portion of provisions	21	17,131,893,624	18,630,738,697
Lease liabilities	7, 18 and 34	149,950,106,115	-
Other current liabilities	7 and 34	104,021,884,700	91,314,141,348
Total current liabilities		1,698,187,475,543	1,574,796,377,567
NON-CURRENT LIABILITIES:			
Net defined benefit liabilities	22	59,409,931,410	40,822,200,125
Deferred tax liabilities	32	176,910,305,069	175,950,146,216
Corporate bond	7, 20 and 34	10,000,000	10,000,000
Long-term accrued expenses	7 and 34	43,610,246,526	51,418,608,045
Provisions	21	17,231,011,174	17,195,182,991
Lease liabilities	7, 18 and 34	295,725,469,600	-
Other non-current liabilities	7	4,994,354,632	5,104,691,400

(Continued)

SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

CONSOLIDATED STATEMENTS OF FINANCIAL POSITION (CONTINUED)

AS OF DECEMBER 31, 2019 AND 2018

	Notes	Korean won December 31, 2019		Korean won December 31, 2018	
Total non-current liabilities			597,891,318,411		290,500,828,777
Total liabilities			2,296,078,793,954		1,865,297,206,344
SHAREHOLDERS' EQUITY:					
Common stock	24	₩	38,688,900,000	₩	38,688,900,000
Share premium			1,297,466,852,618		1,297,466,852,618
Retained earnings	25		5,403,504,408,350		4,821,746,821,634
Other component of equity	26		(193,864,857,726)		(175,447,564,604)
Non-controlling interests			179,361,785,258		166,097,174,722
Total shareholders' equity			6,725,157,088,500		6,148,552,184,370
Total liabilities and shareholders' equity		₩	9,021,235,882,454	₩	8,013,849,390,714

(Concluded)

See notes.

SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

FOR THE YEARS ENDED DECEMBER 31, 2019 AND 2018

	Notes	Korean won December 31, 2019	Korean won December 31, 2018
REVENUES	4, 27 and 35	₩10,719,631,804,166	₩10,034,218,901,478
COST OF REVENUES	28 and 35	8,925,703,658,997	8,369,829,634,622
GROSS PROFIT		1,793,928,145,169	1,664,389,266,856
SELLING AND ADMINISTRATIVE EXPENSES	28 and 29	803,838,748,081	787,033,453,660
OPERATING PROFIT	4	990,089,397,088	877,355,813,196
NON-OPERATING ITEMS:			
Other non-operating income	30 and 35	24,579,015,353	29,243,729,251
Other non-operating expenses	30 and 35	45,534,792,473	28,111,462,915
Finance income	31	137,552,006,802	135,575,773,191
Finance expenses	31	73,480,745,641	60,559,477,429
Gain (loss) on valuation/disposal of investments in associates, net	14	3,082,888,331	3,026,371,038
		46,198,372,372	79,174,933,136
PROFIT BEFORE INCOME TAX EXPENSE		1,036,287,769,460	956,530,746,332
INCOME TAX EXPENSE	32	285,838,812,082	317,738,487,919
NET INCOME		750,448,957,378	638,792,258,413
OTHER COMPREHENSIVE INCOME (LOSS):			
Item not subsequently reclassified to net income:			
Remeasurement of net defined benefit liabilities	22	(59,299,224,648)	(67,590,731,350)
Valuation gain (loss) on fair value through other comprehensive income	12	(145,864,363)	7,534,531,931
		(59,445,089,011)	(60,056,199,419)
Items subsequently reclassified to net income:			
Capital change in equity method	14	(1,960,321,555)	590,356,315
Cumulative effect of foreign currency translation		44,892,583,194	6,692,905,152
		42,932,261,639	7,283,261,467
		(16,512,827,372)	(52,772,937,952)
TOTAL COMPREHENSIVE INCOME		₩ 733,936,130,006	₩ 586,019,320,461

(Continued)

SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (CONTINUED)

FOR THE YEARS ENDED DECEMBER 31, 2019 AND 2018

	Notes	Korean won 2019		Korean won 2018	
NET INCOME ATTRIBUTABLE TO:					
Owners of the Group		₩	736,457,958,716	₩	629,399,570,767
Non-controlling interests			13,990,998,662		9,392,687,646
COMPREHENSIVE INCOME ATTRIBUTABLE TO:					
Owners of the Group			718,792,532,716		579,565,395,281
Non-controlling interests			15,143,597,290		6,453,925,180
EARNINGS PER SHARE:					
Basic earnings per share	36	₩	9,521	₩	8,137
Diluted earnings per share	36	₩	9,521	₩	8,137

(Concluded)

See notes

SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY

FOR THE YEARS ENDED DECEMBER 31, 2019 AND 2018

	Korean won						
	Common stock	Share premium	Retained earnings	Other component of equity	Subtotal	Non-controlling interests	Total
Balance as of January 1, 2018	₩ 38,688,900,000	₩ 1,297,466,852,618	₩ 4,347,047,622,867	₩ (124,924,831,837)	₩ 5,558,278,543,648	₩ 161,150,892,995	₩ 5,719,429,436,643
Comprehensive income	-	-	629,399,570,767	(49,834,175,126)	579,565,395,641	6,453,925,180	586,019,320,821
Net income	-	-	629,399,570,767	-	629,399,570,767	9,392,687,646	638,792,258,413
Valuation gain (loss) on FVOCI	-	-	-	7,437,212,891	7,437,212,891	97,319,040	7,534,531,931
Capital change in equity method	-	-	-	590,356,315	590,356,315	-	590,356,315
Remeasurement of the net defined benefit liabilities	-	-	-	(64,255,224,105)	(64,255,224,105)	(3,335,507,245)	(67,590,731,350)
Cumulative effect of foreign currency translation	-	-	-	6,393,479,773	6,393,479,773	299,425,739	6,692,905,512
Transactions with shareholders	-	-	(154,700,372,000)	(688,557,641)	(155,388,929,641)	(1,507,643,453)	(156,896,573,094)
Dividends	-	-	(154,700,372,000)	-	(154,700,372,000)	(2,294,963,500)	(156,995,335,500)
Changes in ownership interests in subsidiaries	-	-	-	(688,557,641)	(688,557,641)	787,320,047	98,762,406
Balance as of December 31, 2018	₩ 38,688,900,000	₩ 1,297,466,852,618	₩ 4,821,746,821,634	₩ (175,447,564,604)	₩ 5,982,455,009,648	₩ 166,097,174,722	₩ 6,148,552,184,370
Balance as of January 1, 2019	₩ 38,688,900,000	₩ 1,297,466,852,618	₩ 4,821,746,821,634	₩ (175,447,564,604)	₩ 5,982,455,009,648	₩ 166,097,174,722	₩ 6,148,552,184,370
Comprehensive income	-	-	736,457,958,716	(17,665,426,000)	718,792,532,716	15,143,597,290	733,936,130,006
Net income	-	-	736,457,958,716	-	736,457,958,716	13,990,998,662	750,448,957,378
Valuation gain (loss) on FVOCI	-	-	-	(222,174,527)	(222,174,527)	76,310,164	(145,864,363)
Capital change in equity method	-	-	-	(1,960,321,555)	(1,960,321,555)	-	(1,960,321,555)
Remeasurement of the net defined benefit liabilities	-	-	-	(57,683,706,872)	(57,683,706,872)	(1,615,517,776)	(59,299,224,648)
Cumulative effect of foreign currency translation	-	-	-	42,200,776,954	42,200,776,954	2,691,806,240	44,892,583,194
Transactions with shareholders	-	-	(154,700,372,000)	(751,867,122)	(155,452,239,122)	(1,878,986,754)	(157,331,225,876)
Dividends	-	-	(154,700,372,000)	-	(154,700,372,000)	(2,295,032,500)	(156,995,404,500)
Changes in ownership interests in subsidiaries	-	-	-	(751,867,122)	(751,867,122)	416,045,746	(335,821,376)
Balance as of December 31, 2019	₩ 38,688,900,000	₩ 1,297,466,852,618	₩ 5,403,504,408,350	₩ (193,864,857,726)	₩ 6,545,795,303,242	₩ 179,361,785,258	₩ 6,725,157,088,500

See notes.

SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS

FOR THE YEARS ENDED DECEMBER 31, 2019 AND 2018

		Korean won	
	Note	December 31, 2019	December 31, 2018
CASH FLOWS FROM OPERATING ACTIVITIES:			
Cash generated from operating activities	33	₩ 1,129,252,958,912	₩ 1,330,749,415,211
Interest received		64,746,627,104	61,863,057,751
Interest paid		(131,500,711)	(38,569,693)
Dividends received		15,900,000	15,900,000
Income taxes paid		(300,097,340,548)	(196,058,249,099)
		893,786,644,757	1,196,531,554,170
CASH FLOWS FROM INVESTING ACTIVITIES:			
Net increase in short-term financial instruments		(172,409,447,364)	(516,486,544,740)
Decrease (increase) in other current asset		9,026,390,792	(7,004,809,295)
Increase in long-term financial instruments		(4,411,757,471)	(18,097,027,818)
Disposal of property and equipment		1,531,714,801	1,509,595,861
Disposal of intangible assets		2,105,601,273	5,888,893
Decrease in deposits		4,893,061,646	8,174,848,980
Disposal of FVOCI		2,251,342,236	-
Disposal of FVPL		3,874,745,064	-
Acquisition of property and equipment		(341,646,845,962)	(251,434,878,395)
Acquisition of intangible assets		(36,869,903,223)	(26,121,127,847)
Increase in deposits		(7,892,929,168)	(8,187,779,534)
Acquisition of FVOCI		(9,227,592,961)	(2,139,000,000)
Acquisition of FVPL		(2,308,717,465)	-
Acquisition of investments in associates		(54,554,914,392)	-
Decrease (increase) in other non-current assets		(579,007,034)	1,224,556,867
		(606,218,259,228)	(818,556,277,028)
CASH FLOWS FROM FINANCING ACTIVITIES:			
Issues of corporate bond		-	10,000,000
Repayment of corporate bond		-	(10,000,000)
Repayment of lease liabilities		(151,868,876,017)	-
Dividends		(156,995,404,500)	(156,995,335,500)
Payment of non-controlling interests		118,620,000	787,320,047
Decrease in non-controlling interests		(57,000,000)	-
		(308,802,660,517)	(156,208,015,453)
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS		(21,234,274,988)	221,767,261,689
CASH AND CASH EQUIVALENTS, BEGINNING OF YEAR		1,161,683,996,643	931,461,393,278
EFFECT OF EXCHANGE RATE CHANGE ON CASH AND CASH EQUIVALENTS		7,733,877,224	8,455,341,676
CASH AND CASH EQUIVALENTS, END OF YEAR		₩ 1,148,183,598,879	₩ 1,161,683,996,643

See notes.

SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
AS OF AND FOR THE YEARS ENDED DECEMBER 31, 2019 AND 2018

1. GENERAL:

Samsung SDS Co., Ltd. (the "Company") and its subsidiaries (collectively, the "Group") have prepared the consolidated financial statements in accordance with Korean International Financial Reporting Standards ("K-IFRS") 1110, *Consolidated Financial Statements.* The Company was incorporated in 1985 to engage in the information processing system implementation, software development and professional service related to information processing technology. The Company has provided Information Technology ("IT") services, including cloud and IT Outsourcing ("ITO") with a majority of companies and Samsung Group. In addition, the Company offers global logistics Business Process Outsourcing("BPO") based on business solutions, and Supply Chain Management ("SCM") consulting.

The Company is located at 125 Olympic-ro 35-gil, Songpa-gu, Seoul, Republic of Korea. The Company's common shares were listed on the Stock Market of Korea Exchange in 2014. As of December 31, 2019, the capital stock of the Company is ₩38,689 million, and the shareholders are as follows:

	Number of shares	Ownership (%)
Samsung Electronics Co., Ltd.	17,472,110	22.6%
Samsung C&T Corporation	13,215,822	17.1%
Lee, Jae-yong	7,116,555	9.2%
Lee, Bu-jin	3,018,859	3.9%
Lee, Suh-hyeon	3,018,859	3.9%
Others	33,535,595	43.3%
	77,377,800	100.0%

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES:

The Group has prepared the consolidated financial statements in accordance with the Korean International Financial Reporting Standards ("K-IFRS"). The principal accounting policies are set out below. Except for the effect of the amendments to K-IFRS and new interpretations set out below, the principal accounting policies used to prepare the consolidated financial statements as of and for the year ended December 31, 2019, are consistent with the accounting policies used to prepare the consolidated financial statements as of and for the year ended December 31, 2018.

The accompanying consolidated financial statements have been prepared on a historical cost basis, except for certain non-current assets and financial instruments that are measured at fair values, as explained in the accounting policies below. Historical cost is based on the fair values of the consideration given.

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date, regardless of whether that price is directly observable or estimated using another valuation technique. In estimating the fair value of an asset or a liability, the Group takes into account the characteristics of the asset or liability if market participants would take those characteristics into account when pricing the asset or liability at the measurement date. Fair value for measurement and/or disclosure purposes in these consolidated financial statements is determined on such a basis, except for share-based payment transactions that are within the scope of K-IFRS 1102 *Share-Based Payment*, leasing transactions that are within the scope of K-IFRS 1116 *Leases*, and measurements that have some similarities to fair value but are not fair value, such as net realizable value in K-IFRS 1002 *Inventories* or value in use in K-IFRS *1036 Impairment of Assets*.

(1) New and Amended to K-IFRS and new interpretations that are mandatorily effective for the current year

In the current year, the Group has applied a number of new and amended to K-IFRS and new interpretations issued that are mandatorily effective for accounting periods beginning on or after January 1, 2019.

- K-IFRS 1116 – Leases (Enactment)

In the current year, the Company has applied K-IFRS 1116 (as issued by the Korea Accounting Standards Board in November 2017) that is effective for annual periods that begin on or after January 1, 2019.

K-IFRS 1116 introduces new or amended requirements with respect to lease accounting. It introduces significant changes to lessee accounting by removing the distinction between operating and finance lease and requiring the recognition of a right-of-use asset and a lease liability at the commencement for all leases, except for short-term leases and leases of low-value assets. In contrast to lessee accounting, the requirements for lessor accounting have remained largely unchanged. Details of these new requirements are described in '(8) Lease'. The impact of the adoption of K-IFRS 1116 on the Group's consolidated financial statements is described below.

The date of initial application of K-IFRS 1116 for the Group is January 1, 2019.

The Group has applied K-IFRS 1116 using the cumulative catch-up approach, with these practical expedients.

- To recognize the cumulative effect of initially applying this standard as an adjustment to the opening balance of retained earnings (or other component of equity, as appropriate) at the date of initial application.
- Not to restate comparative information applying K-IFRS 1017 *Leases* and K-IFRS 2104 Determining whether an Arrangement contains a Lease.

(a) Impact of the new definition of a lease

The Group has made use of the practical expedient available on transition to K-IFRS 1116 not to reassess whether a contract is or contains a lease. Accordingly, the definition of a lease in accordance with K-IFRS 1017 and K-IFRS 2104 will continue to be applied to those contracts entered or modified before January 1, 2019.

The change in definition of a lease mainly relates to the concept of control. K-IFRS 1116 determines whether a contract contains a lease on the basis of whether the customer has the right to control the use of an identified asset for a period of time in exchange for consideration. This is in contrast to the focus on 'risks and rewards' in K-IFRS 1017 and K-IFRS 2104.

The Group applies the definition of a lease and related guidance set out in K-IFRS 1116 to all contracts entered into or changed on or after January 1, 2019.

(b) Impact on Lessee Accounting

(i) Former operating leases

K-IFRS 1116 changes how the Group accounts for leases previously classified as operating leases under K-IFRS 1017, which were off consolidated statements of financial position.

The Group accounts for Lease (except where practical expedients are applied for short-term lease or small-scale underlying asset lease) as follows:

- Recognizes right-of-use assets and lease liabilities in the consolidated statements of financial position, initially measured at the present value of the future lease payments. However, the Asset (adjusts the amount of the prepaid or accrued lease in relation to the lease recognized in the financial statement just before the date of initial application in accordance with paragraph C8 (b)(ii) of K-IFRS 1116;
- Recognizes depreciation of right-of-use assets and interest on lease liabilities in profit or loss; and
- Separates the total amount of cash paid into a principal portion (presented within financing activities) and interest (presented within financing activities) in the consolidated statements of cash flows.

Lease incentives (e.g., rent-free period) are recognized as part of the measurement of the right-of-use assets and lease liabilities, whereas under K-IFRS 1017, they resulted in the recognition of a lease incentive, amortized as a reduction of rental expenses generally on a straight-line basis.

Under K-IFRS 1116, right-of-use assets are tested for impairment in accordance with K-IFRS 1036.

For short-term leases (lease term of 12 months or less) and leases of low-value assets, the Company has opted to recognize a lease expense on a straight-line basis as permitted by K-IFRS 1116.

The Group used these practical expedients when applying the cumulative catch-up approach to leases previously classified as an operating lease applying K-IFRS 1017.

- To apply a single discount rate to a portfolio of leases with reasonably similar characteristics
- Adjust the right-of-use asset at the date of initial application by the amount of any provision for onerous leases recognized immediately before the date of initial application
- To exclude initial direct costs from the measurement of the right-of-use asset at the date of initial application.
- To use hindsight, such as in determining the lease term if the contract contains options to extend or terminate the lease

(ii) Former finance leases

Unless the Group chooses to apply the exemption from the recognition of small-underlying asset leases, it applies K-IFRS 1017 and classifies leases as financial leases immediately before the date of initial application. The carrying amounts of lease assets and lease liabilities measured in accordance with K-IFRS 1017 are reclassified without any adjustments. The right-or-use assets and lease liabilities shall be accounted for in accordance with K-IFRS 1116 from 1 January 2019.

(c) Impact on Lessor Accounting

K-IFRS 1116 does not change substantially how a lessor accounts for leases. Under K-IFRS 1116, a lessor continues to classify leases as either finance leases or as operating leases and account for those two types of leases differently.

However, K-IFRS 1116 has changed and expanded the disclosures required, in particular, with regard to how a lessor manages the risks arising from its residual interest in leased assets.
Under K-IFRS 1116, an intermediate lessor accounts for the head lease and the sub-lease as two separate contracts. The intermediate lessor is required to classify the sub-lease as a finance or operating lease by reference to the right-of-use asset arising from the head lease (and not by reference to the underlying asset as was the case under K-IFRS 1017).

Because of this change, the Group has reclassified certain of its sub-lease agreements as finance leases. As required by K-IFRS 1109, an allowance for expected credit losses has been recognized on the finance lease receivables.

(d) Financial impact of the initial application of K-IFRS 1116

The lessee’s weighted average incremental borrowing rate used when measuring lease liabilities at January 1, 2019, is 3.0%.

The table below demonstrates the relationship between the discounted amount of operating lease commitments as at December 31, 2018, applied under K-IFRS 1017 using the incremental borrowing rate at the date of initial application, and the amount of lease liabilities at the date of initial application.

	Korean won (in thousands)		
	Balance as at January 1, 2019		
	Before	Change	After
CURRENT ASSETS			
Amount of deposit present value discount (Prepaid expenses)	₩ 6,104,217	₩ (6,104,217)	₩ -
Finance lease receivables (Other receivables) (Notes 7 and 19)	-	4,940,155	4,940,155
NON-CURRENT ASSETS			
Assets related to restoration provisions (Property, plant and equipment) (Note 15)	6,248,748	(6,248,748)	-
Right-of-use assets (Note 17)	-	422,547,273	422,547,273
Finance lease receivables (Other non-current assets) (Notes 7 and 19)	-	20,563,168	20,563,168
CURRENT LIABILITIES			
Lease liabilities (Notes 7 and 18)	-	121,780,047	121,780,047
NON-CURRENT LIABILITIES			
Lease liabilities (Notes 7 and 18)	-	313,917,584	313,917,584

- K-IFRS 1109 – *Financial Instruments* (Amendment)

The Group has adopted the amendments to K-IFRS 1109 for the first time in the current year. The amendments to K-IFRS 1109 clarify that for the purpose of assessing whether a prepayment feature meets the 'solely payments of principal and interest' (SPPI) condition, the party exercising the option may pay or receive reasonable compensation for the prepayment irrespective of the reason for prepayment. In other words, financial assets with prepayment features with negative compensation do not automatically fail SPPI.

-K-IFRS 1028 *Long-Term Investments in Associates and Joint Ventures* (Amendment)

The amendment clarifies that K-IFRS 1109, including its impairment requirements, applies to other financial instruments in an associate or a 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 a joint venture. The Group applies K-IFRS 1109 to such long-term interests before it applies K-IFRS 1028. In applying K-IFRS 1109, the Group does not take account of any adjustments to the carrying amount of long-term interests required by K-IFRS 1028 (i.e., adjustments to the carrying amount of long-term interests arising from the allocation of losses of the investee or assessment of impairment in accordance with K-IFRS 1028).

- Annual Improvements to K-IFRS Standards 2015–2017 Cycle

The annual improvements include amendments to four standards such as K-IFRS 1012 *Income Taxes*, K-IFRS 1023 *Borrowing Costs*, K-IFRS 1103 *Business Combinations*, and K-IFRS 1111 *Joint Arrangements*.

1. K-IFRS 1012 *Income Taxes*
The amendments clarify that an entity should recognize the income tax consequences of dividends in profit or loss, other comprehensive income ("OCI") or equity according to where the entity originally recognized the transactions that generated the distributable profits. This is the case irrespective of whether different tax rates apply to distributed and undistributed profits.

2. K-IFRS 1023 *Borrowing Costs*
The amendments clarify that if any specific borrowing remains outstanding after the related asset is ready for its intended use or sale, that borrowing becomes part of the funds that an entity borrows generally when calculating the capitalization rate on general borrowings.

3. K-IFRS 1103 *Business Combinations*
The amendments to K-IFRS 1103 clarify that when an entity obtains control of a business that is a joint operation, the entity applies the requirements for a business combination achieved in stages, including remeasuring its previously held interest (PHI) in the joint operation at fair value. The PHI to be remeasured includes any unrecognized assets, liabilities and goodwill relating to the joint operation.

4. K-IFRS 1111 *Joint Arrangements*
The amendments to K-IFRS 1111 clarify that when a party that participates in, but does not have joint control of, a joint operation that is a business obtains joint control of such a joint operation, the entity does not remeasure its PHI in the joint operation.

- K-IFRS *1019 Employee Benefits* (Amendment)

The amendments clarify that the past service cost (or of the gain or loss on settlement) is calculated by measuring the defined benefit liability (asset) using updated assumptions and comparing benefits offered and plan assets before and after the plan amendment (or curtailment or settlement) but ignoring the effect of the asset ceiling (that may arise when the defined benefit plan is in a surplus position). K-IFRS 1019 clarifies that the change in the effect of the asset ceiling that may result from the plan amendment (or curtailment or settlement) is determined in the second step and is recognized in the normal manner in OCI.

The paragraphs that relate to measuring the current service cost and the net interest on the net defined benefit liability (asset) have also been amended. The Group now be required to use the updated assumptions from this remeasurement to determine current service cost and net interest for the remainder of the reporting period after the change in the plan. In the case of the net interest, the amendments make it clear that for the period post plan amendment, the net interest is calculated by multiplying the net defined benefit liability (asset) as remeasured under K-IFRS 1019.99 with the discount rate used in the remeasurement (also taking into account the effect of contributions and benefit payments on the net defined benefit liability (asset)).

- K-IFRS 1115 *Revenue from Contracts with Customers* (Amendment)

The amendment clarifies that it does not reduce the scope of disclosure even if K-IFRS 1115 is applied by revising the meaning of 'contract' referred to in paragraph 129.1 to 'individual contract' in relation to 'additional disclosure of cost application method'. In addition, because K-IFRS 1115 does not distinguish between the types of contracts, service contracts that were not covered by the previous revenue standard, paragraph 45.1, may also be subject to paragraph 129.1 of K-IFRS 1115. This clarifies that the scope of the contracts that are subject to the disclosure requirement in accordance with paragraph 129.1 may be broadened compared to the previous revenue standard.

- K-IFRS 2123 Interpretation Uncertainty over Income Tax Treatments (Enactment)

K-IFRS 2123 interpretation sets out how to determine the accounting tax position when there is uncertainty over income tax treatments. The interpretation requires an entity to:

- Determine whether uncertain tax positions are assessed separately or as a group; and
- Assess whether it is probable that a tax authority will accept an uncertain tax treatment used, or proposed to be used, by an entity in its income tax filings:
    - If yes, the entity should determine its accounting tax position consistently with the tax treatment used or planned to be used in its income tax filings.
    - If no, the entity should reflect the effect of uncertainty in determining its accounting tax position.

The Group does not anticipate that the application of the enactment and amendments will have a significant impact on the Group's consolidated financial statements.

(2) New and revised K-IFRS issued, but not yet effective

-K-IFRS 1103 Definition of a business (Amendment)

The amendments clarify that while businesses usually have outputs, the outputs are not required for an integrated set of activities and assets to qualify as a business. To be considered a business, an acquired set of activities and assets must include, at a minimum, an input and a substantive process that together significantly contribute to the ability to create outputs. Additional guidance is provided that helps determine whether a substantive process has been acquired.

The amendments introduce an optional concentration test that permits a simplified assessment of whether an acquired set of activities and assets is not a business. Under the optional concentration test, the acquired set of activities and assets is not a business if substantially all of the fair value of the gross assets acquired is concentrated in a single identifiable asset or group of similar assets.

The amendments are applied prospectively to all business combinations and asset acquisitions for which the acquisition date is on or after the first annual reporting period beginning on or after January 1, 2020, with early application permitted.

-Amendments to References to the Conceptual Framework in K-IFRS Standards (Amendment)

Together with the revised conceptual framework, which became effective upon publication on December 21, 2018, the International Accounting Standards Board ("IASB") has also issued amendments to references to the conceptual framework in IFRS. The document contains amendments to K-IFRS 1102, 1103, 1106, 1114, 1001, 1008, 1034, 1037, 1038, 2112, 2119, 2120, 2122, and 2032

Not all amendments, however, update those pronouncements with regard to references to and quotes from the framework so that they refer to the revised conceptual framework. Some pronouncements are only updated to indicate which version of the framework they are referencing to (the framework (2007), the IASB framework of 2010, or the new revised framework of 2018) or to indicate that definitions in the standard have not been updated with the new definitions developed in the revised conceptual framework.

The amendments, where they actually are updates, are effective for annual periods beginning on or after January 1, 2020, with early application permitted.

The Group does not anticipate that the application of the enactment and amendments will have a significant impact on its consolidated financial statements.

(2) Basis of consolidation

The consolidated financial statements incorporate the financial statements of the Company and its entities (including structured entities) controlled by the Company (and its subsidiaries). Control is achieved where the Company:
1) Has the power over the investee; 2) is exposed or has rights to variable returns from its involvement with the investee; and 3) has the ability to use its power to affect its returns. The Group reassesses whether or not it controls an investee if facts and circumstances indicate that there are changes to one or more of the three elements of controls listed above.

When the Group has less than a majority of the voting rights of an investee, it has power over the investee when the voting rights are sufficient to give it the practical ability to direct the activities of the investee unilaterally. The Group considers all relevant facts and circumstances in assessing whether or not its voting rights in an investee are sufficient to give it the power, including:

- The size of the Group's holding of voting rights relative to the size and dispersion of holdings of other vote holders;
- Potential voting rights held by the Group, other vote holders or other parties;
- Rights arising from other contractual arrangements; and
- Any additional facts and circumstances that indicate that the Group has, or does not have, the current ability to direct the relevant activities at the time that decisions need to be made, including voting patterns at previous shareholders' meetings.

Consolidation of a subsidiary begins when the Company obtains control over the subsidiary and ceases when the Company loses control of the subsidiary. Specifically, the results of subsidiaries acquired or disposed of during the year are included in profit or loss from the date the Company gains control until the date when the Company ceases to control the subsidiary. Profit or loss and each component of OCI are attributed to the owners of the Company and to the non-controlling interests. Total comprehensive income of the subsidiaries is attributed to the owners of the Company and to the non-controlling interests even if this results in the non-controlling interests having a deficit balance.

When necessary, adjustments are made to the financial statements of subsidiaries to bring their accounting policies in line with the Group's accounting policies.

All intragroup transactions and related assets, liabilities, income and expenses are eliminated in full on consolidation.

Non-controlling interests in subsidiaries are identified separately from the Group's equity therein. Those interests of non-controlling shareholders that are present ownership interests entitling their holders to a proportionate share of net assets upon liquidation may initially be measured at 1) fair value or 2) at the non-controlling interests' proportionate share of the fair value of the acquiree's identifiable net assets. The choice of measurement is made on an acquisition-by-acquisition basis. Other non-controlling interests are initially measured at fair value. Subsequent to acquisition, the carrying amount of non-controlling interests is the amount of those interests at initial recognition plus the non-controlling interests' share of subsequent changes in equity. Total comprehensive income is attributed to non-controlling interests even if this results in the non-controlling interests having a deficit balance.

Changes in the Group's ownership interests in subsidiaries that do not result in the Group losing control over the subsidiaries are accounted for as equity transactions. The carrying amounts of the Group's interests and the non-controlling interests are adjusted to reflect the changes in their relative interests in the subsidiaries. Any difference between the amount by which the non-controlling interests are adjusted and the fair value of the consideration paid or received is recognized directly in equity and attributed to the owners of the Company.

When the Group loses control over a subsidiary, a gain or loss on disposal is calculated as the difference between (i) the aggregate of the fair value of the consideration received and the fair value of any retained interest and (ii) the previous carrying amount of the assets (including goodwill) and liabilities of the subsidiary and any non-controlling interests. When assets of the subsidiary are carried at revalued amounts or fair values and the related cumulative gain or loss has been recognized in OCI and accumulated in equity, the amounts previously recognized in OCI and accumulated in equity are accounted for as if the Group had directly disposed of the relevant assets (i.e., reclassified to profit or loss or transferred directly to retained earnings). The fair value of any investment retained in the former subsidiary at the date when control is lost is recognized as the fair value on initial recognition for subsequent accounting under K-IFRS 1109 *Financial Instruments* or, when applicable, the cost on initial recognition of an investment in an associate or a joint venture.

(3) Business combination

Acquisitions of businesses are accounted for using the acquisition method. The consideration transferred in a business combination is measured at fair value, which is calculated as the sum of the acquisition-date fair values of the assets transferred by the Group, liabilities incurred by the Group to the former owners of the acquiree and the equity interests issued by the Group in exchange for control of the acquiree. Acquisition-related costs are recognized in profit or loss as incurred.

At the acquisition date, the identifiable assets acquired and the liabilities assumed are recognized at their fair value at the acquisition date, except that:

- Deferred tax assets or liabilities and liabilities or assets related to employee benefit arrangements are recognized and measured in accordance with K-IFRS 1012, *Income Taxes*, and K-IFRS 1019, *Employee Benefits*, respectively;
- Liabilities or equity instruments related to share-based payment arrangements of the acquiree or share-based payment arrangements of the Group entered into to replace share-based payment arrangements of the acquiree are measured in accordance with K-IFRS 1102, *Share-Based Payment*, at the acquisition date; and
- Assets (or disposal groups) that are classified as held for sale in accordance with K-IFRS 1105, *Non-Current Assets Held for Sale and Discontinued Operations*, are measured in accordance with that standard.

Goodwill is measured as the excess of the sum of a) the consideration transferred, b) the amount of any non-controlling interests in the acquiree and c) the fair value of the acquirer's previously held equity interest in the acquiree (if any) over the net of the acquisition-date amounts of the identifiable assets acquired and the liabilities assumed. If, after reassessment, the net of the acquisition-date amounts of the identifiable assets acquired and liabilities assumed exceeds the sum of a) the consideration transferred, b) the amount of any non-controlling interests in the acquiree and c) the fair value of the acquirer's previously held interest in the acquiree (if any), the excess is recognized immediately in profit or loss as a bargain purchase gain.

When the consideration transferred by the Group in a business combination includes assets or liabilities resulting from a contingent consideration arrangement, the contingent consideration is measured at its acquisition-date fair value and included as part of the consideration transferred in a business combination. Changes in the fair value of the contingent consideration that qualify as measurement-period adjustments are adjusted retrospectively, with corresponding adjustments against goodwill. Measurement-period adjustments are adjustments that arise from additional information obtained during the 'measurement period' (which cannot exceed one year from the acquisition date) about facts and circumstances that existed at the acquisition date.

The subsequent accounting for changes in the fair value of the contingent consideration that do not qualify as measurement-period adjustments depends on how the contingent consideration is classified. Contingent consideration that is classified as equity is not remeasured at subsequent reporting dates and its subsequent settlement is accounted for within equity. Other contingent consideration is remeasured to fair value at subsequent reporting dates with changes in fair value recognized in profit or loss.

When a business combination is achieved in stages, the Group's previously held interests(including joint operations) in the acquired entity are remeasured to its acquisition-date fair value and the resulting gain or loss, if any, is recognized in profit or loss. Amounts arising from interests in the acquiree prior to the acquisition date that have previously been recognized in OCI are reclassified to profit or loss, where such treatment would be appropriate if that interest were disposed of.

If the initial accounting for a business combination is incomplete by the end of the reporting period in which the combination occurs, the Group reports provisional amounts for the items for which the accounting is incomplete. Those provisional amounts are adjusted during the measurement period (see above), or additional assets or liabilities are recognized, to reflect new information obtained about facts and circumstances that existed at the acquisition date that, if known, would have affected the amounts recognized at that date.

(4) Investments in associates and joint ventures

An associate is an entity over which the Group has significant influence and that is neither a subsidiary nor an interest in a joint venture. Significant influence is the power to participate in the financial and operating policy decisions of the investee but is not control or joint control over those policies.

A joint venture is a joint arrangement whereby the parties that have joint control of the arrangement have rights to the net assets of the joint arrangement. Joint control is the contractually agreed sharing of control of an arrangement, which exists only when decisions about the relevant activities require unanimous consent of the parties sharing control.

The results of operations and assets and liabilities of associates or joint ventures are incorporated in these consolidated financial statements using the equity method of accounting, except when the investment is classified as held for sale, in which case, it is accounted for in accordance with K-IFRS 1105, *Non-Current Assets Held for Sale and Discontinued Operations*. Under the equity method, an investment in an associate or a joint venture is initially recognized in the consolidated statements of financial position at cost and adjusted thereafter to recognize the Group's share of the profit or loss and OCI of the associate or joint venture. When the Group's share of losses of an associate or a joint venture exceeds its interest in that associate or joint venture (which includes any long-term interests that, in substance, form part of the Group's net investment in the associate or joint venture), it discontinues recognizing its share of further losses. Additional losses are recognized only to the extent that the Group has incurred legal or constructive obligations or made payments on behalf of the associate or joint venture.

An investment in an associate or a joint venture is accounted for using the equity method from the date on which the investee becomes an associate or a joint venture. On acquisition of the investment in an associate or a joint venture, any excess of the cost of the investment over the Group's share of the net fair value of the identifiable assets and liabilities of the investee is recognized as goodwill, which is included within the carrying amount of the investment. Any excess of the Group's share of the net fair value of the identifiable assets and liabilities over the cost of the investment, after reassessment, is recognized immediately in profit or loss in the period in which the investment is acquired.

The requirements of K-IFRS 1028 are applied to determine whether it is necessary to recognize any impairment loss with respect to the Group's investment in an associate or a joint venture. When necessary, the entire carrying amount of the investment (including goodwill) is tested for impairment in accordance with K-IFRS 1036 as a single asset by comparing its recoverable amount (higher of value in use and fair value less costs of disposal) with its carrying amount. Any impairment loss recognized is not allocated to any asset, including goodwill that forms part of the carrying amount of the investment. Any reversal of that impairment loss is recognized in accordance with K-IFRS 1036 to the extent that the recoverable amount of the investment subsequently increases.

The Group discontinues the use of the equity method from the date when the investment ceases to be an associate or a joint venture. When the Group retains an interest in the former associate or a joint venture and the retained interest is a financial asset, the Group measures the retained interest at fair value at that date and the fair value is regarded as its fair value on initial recognition in accordance with K-IFRS 1109. The difference between the carrying amount of the associate or a joint venture at the date the equity method was discontinued, and the fair value of any retained interest and any proceeds from disposing of a part interest in the associate or a joint venture is included in the determination of the gain or loss on disposal of the associate or joint venture. In addition, the Group accounts for all amounts previously recognized in OCI in relation to that associate on the same basis as would be required if that associate had directly disposed of the related assets or liabilities. Therefore, if a gain or loss previously recognized in OCI by that associate or joint venture would be reclassified to profit or loss on the disposal of the related assets or liabilities, the Group reclassifies the gain or loss from equity to profit or loss (as a reclassification adjustment) when the associate or joint venture is disposed of.

When the Group reduces its ownership interest in an associate or a joint venture but continues to use the equity method, it reclassifies to profit or loss the proportion of the gain or loss that had previously been recognized in OCI relating to that reduction in ownership interest if that gain or loss would be reclassified to profit or loss on the disposal of the related assets or liabilities.

When the Group's entity transacts with an associate or a joint venture of the Group, profits and losses resulting from the transactions with the associate or joint venture are recognized in the Group's consolidated financial statements only to the extent of interests in the associate or joint venture that are not related to the Group.

The Group applies K-IFRS 1109, including the impairment requirements, to long-term interests in an associate or joint venture to which the equity method is not applied and which form part of the net investment in the investee. Furthermore, in applying K-IFRS 1109 to long-term interests, the Group does not take into account adjustments to their carrying amount required by K-IFRS 1028 (i.e. adjustments to the carrying amount of long-term interests arising from the allocation of losses of the investee or assessment of impairment in accordance with K-IFRS 1028).

(5) Goodwill

Goodwill resulting from an acquisition of a business is carried at cost as established at the date of acquisition of the business, less accumulated impairment losses, if any.

For the purpose of impairment testing, goodwill is allocated to each of the Group's cash-generating units ("CGUs") (or groups of CGUs) that are expected to benefit from the synergies of the combination.

A CGU to which goodwill has been allocated is tested for impairment annually, or more frequently when there is indication that the unit may be impaired. If the recoverable amount of the CGU is less than its carrying amount, the impairment loss is allocated first to reduce the carrying amount of any goodwill allocated to the unit and then to the other assets of the unit on a pro rata basis based on the carrying amount of each asset in the unit. Any impairment loss for goodwill is recognized directly in profit or loss. An impairment loss recognized for goodwill is not reversed in subsequent periods.

On disposal of the relevant CGU, the attributable amount of goodwill is included in the determination of the profit or loss on disposal.

The Group's policy for goodwill resulting from the acquisition of an associate is described at Note 2. (4).

(6) Non-current classified assets held for sale

Non-current assets (and disposal groups) classified as held for sale are measured at the lower of the carrying amount and the fair value, less costs to sell.

Non-current assets and disposal groups are classified as held for sale if their carrying amount will be recovered through a sale transaction rather than through continuing use. This condition is regarded as met only when the sale is highly probable and the asset (or disposal group) is available for immediate sale in its present condition. Management must be committed to the sale which should be expected to qualify for recognition as a completed sale within one year from the date of classification.

When the Group is committed to a sale plan involving loss of control of a subsidiary, all of the assets and liabilities of that subsidiary are classified as held for sale when the criteria described above are met, regardless of whether the Group will retain a non-controlling interest in its former subsidiary after the sale.

When the Group is committed to a sale plan involving disposal of an investment in an associate or, a portion of an investment in an associate, the investment, or the portion of the investment in the associate that will be disposed of is classified as held for sale when the criteria described above are met, and the Group ceases to apply the equity method in relation to the portion that is classified a held for sale. Any retained portion of an investment in an associate that has not been classified as held for sale continues to be accounted for using the equity method.

(7) Revenue recognition

The Group recognizes revenue from the following major sources:

· IT service
· Logistics BPO

Revenue is measured based on the consideration to which the Group expects to be entitled in a contract with a customer and excludes amounts collected on behalf of third parties.
The Group recognizes revenue when it transfers control of a product or service to a customer.

1) IT service

The IT service is divided into order-based consulting/SI (System Integration), maintenance, outsourcing and telecommunication infrastructure services

① Consulting/SI (System Integration) service

The Group recognizes revenues under Application of K-IFRS 1115 (1) provision of hardware, software and professional services (custom-built systems), (2) Provision of commercial software installation services, (3) Provision of software and professional services (provision of custom-built software), (4) Provision of hardware and software.

The Group recognizes revenues by cost-to-cost method for basis of percentage of total costs incurred when constructing custom-built systems, providing commercial software installation services, and supplying custom-built software.

According to K-IFRS 1115, the Group's custom-built systems, commercial software installation service, and custom-built software are performance improvements, which create or enhance an asset that the customer controls as the asset is created or enhanced, therefore the control over assets and service is transferred over period to customer. As the Group satisfies the performance obligation over period, revenue is recognized over period, and it recognized before being billed to the customer is included in contract assets in accordance with K-IFRS 1115.

Provisions for project losses were adjusted from unbilled or over claimed construction, as K-IFRS 1011 requires recognized losses to added or subtracted on unbilled or over claimed construction. In contrast, K-IFRS 1115 does not require the adjustment for contract assets or contract liabilities; instead, losses are shown as the separate account, as a provision, in accordance with K-IFRS 1037.

The Group provides servers, storage, network equipments, PCs of hardware, and SAP, ORACLE of software, recognizing revenue when it transfers control of the asset to customer. And the group recognizes receivables when the asset is delivered and inspected; customer takes risk of obsolescence of the good or service.

② Maintenance services
The Group provides customers with maintenance services after consulting/SI (System Integration) service provision. Revenue related to maintenance services is recognized over period, and it recognized by straight-line method over the service period.

③ Outsourcing Service
The Group provides customers with IT outsourcing services, which are divided into computerized agency service, cloud, server rental service, and business travel service.

The Group provides computerized service for a certain period of time after signing a service contract and performing obligations, the customer receives direct benefits. Accordingly, revenue related to agency services is recognized over period, and it recognized by straight-line method over the service period..

The Group also provides customers with cloud and server rental service, and the usage of services is directly equivalent to the group's value, so the group recognizes revenue by applying a usage-based calculation method.

In the case of business travel services, the Group provides services according to the customer's request, and the cost incurred for the completion of the service directly corresponds to the value, so it recognizes revenue by applying the calculation method based on the cost incurred in fulfilling the obligation.

④ Telecommunications infrastructure services

The Group provides telecommunication infrastructure services such as Internet-only and telephone lines that customers receive and consume, and their line usage directly corresponds to the value the group gives to the customers, so the group recognizes revenues by applying the method for basis of the line usage.

2) Logistics BPO

The Group is engaged in a logistics BPO business that provides SCM consulting services to the customers through its own logistics execution solution.

Applying K-IFRS 1115 identifies separate performance obligations, such as transportation and warehouse operations.

(8) Lease

The Group has chosen the cumulative catch-up approach at the date of initial application of K-IFRS 1116. Therefore, the Group does not restate the comparative information. The details of accounting policies applied under K-IFRS 1017 and K-IFRS 1116 are as follows:

1) Accounting policy applied on or after January 1, 2019

1-1) The Group as lessee

The Group assesses whether a contract is or contains a lease, at the inception of the contract. The Group recognizes a right-of-use asset and a corresponding lease liability with respect to all lease arrangements in which it is the lessee, except for short-term leases (defined as leases with a lease term of 12 months or less) and leases of low-value assets (such as tablets and personal computers, small items of office furniture and telephones). For these leases, the Group recognizes the lease payments as an operating expense on a straight-line basis over the term of the lease, unless another systematic basis is more representative of the time pattern in which economic benefits from the leased assets are consumed.

The lease liability is initially measured at the present value of the lease payments that are not paid at the commencement date, discounted by using the rate implicit in the lease. If this rate cannot be readily determined, the Group uses its incremental borrowing rate.

Lease payments included in the measurement of the lease liability comprise:

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

The lease liability is presented as a separate line item in the consolidated statements of financial position.

The lease liability is subsequently measured by increasing the carrying amount to reflect interest on the lease liability (using the effective interest method) and by reducing the carrying amount to reflect the lease payments made.

The Group remeasures the lease liability (and makes a corresponding adjustment to the related right-of-use asset) whenever:

- The lease term has changed or there is a significant event or change in circumstances resulting in a change in the assessment of exercise of a purchase option, in which case, the lease liability is remeasured by discounting the revised lease payments using a revised discount rate.
- The lease payments change due to changes in an index or rate or a change in expected payment under a guaranteed residual value, in which cases, the lease liability is remeasured by discounting the revised lease payments using an unchanged discount rate (unless the lease payments change is due to a change in a floating interest rate, in which case, a revised discount rate is used).
- A lease contract is modified and the lease modification is not accounted for as a separate lease, in which case, the lease liability is remeasured based on the lease term of the modified lease by discounting the revised lease payments using a revised discount rate at the effective date of the modification.

The right-of-use assets comprise the initial measurement of the corresponding lease liability, lease payments made at or before the commencement day, less any lease incentives received and any initial direct costs. They are subsequently measured at cost, less accumulated depreciation and impairment losses.

Whenever the Group incurs an obligation for costs to dismantle and remove a leased asset, restore the site on which it is located or restore the underlying asset to the condition required by the terms and conditions of the lease, a provision is recognized and measured under K-IFRS 1037. To the extent that the costs relate to a right-of-use asset, the costs are included in the related right-of-use asset, unless those costs are incurred to produce inventories.

Right-of-use assets are depreciated over the shorter period of lease term and the useful life of the underlying asset. If a lease transfers ownership of the underlying asset or the cost of the right-of-use asset reflects that the Group expects to exercise a purchase option, the related right-of-use asset is depreciated over the useful life of the underlying asset. The depreciation starts at the commencement date of the lease.

The right-of-use assets are presented as a separate line in the consolidated statements of financial position.

The Group applies K-IFRS 1036 to determine whether a right-of-use asset is impaired and accounts for any identified impairment loss as described in the 'Property and Equipment' policy (Note 2.(13)).

Variable rents that do not depend on an index or rate are not included in the measurement of the lease liability and the right-of-use asset. The related payments are recognized as an expense in the period in which the event or condition that triggers those payments occurs and are included in profit or loss.

As a practical expedient, K-IFRS 1116 permits a lessee not to separate non-lease components and instead account for any lease and associated non-lease components as a single arrangement. The Group has not used this practical expedient. For contracts that contain a lease component and one or more additional lease or non-lease components, the Group allocates the consideration in the contract to each lease component on the basis of the relative stand-alone price of the lease component and the aggregate stand-alone price of the non-lease components.

1-2) The Group as lessor

Leases for which the Group is a lessor are classified as finance or operating leases. Whenever the terms of the lease transfer substantially all the risks and rewards of ownership to the lessee, the contract is classified as a finance lease. All other leases are classified as operating leases.

When the Group is an intermediate lessor, it accounts for the head lease and the sub-lease as two separate contracts. The sub-lease is classified as a finance or as an operating lease by reference to the right-of-use asset arising from the head lease .

Rental income from operating leases is recognized on a straight-line basis over the term of the relevant lease. Initial direct costs incurred in negotiating and arranging an operating lease are added to the carrying amount of the leased asset and recognized on a straight-line basis over the lease term
Amounts due from lessees under finance leases are recognized as receivables at the amount of the Group's net investment in the leases. Finance lease income is allocated to accounting periods so as to reflect a constant periodic rate of return on the Group's net investment outstanding in respect of the leases

When a contract includes both lease and non-lease components, the Group applies K-IFRS 1115 to allocate the consideration under the contract to each component .

2) Accounting policy applied before January 1, 2019

Leases are classified as finance leases whenever the terms of the lease transfer substantially all the risks and rewards of ownership to the lessee. All other leases are classified as operating leases.

2-1) The Group as lessee

Assets held under finance leases are initially recognized as assets of the Group at their fair value at the inception of the lease or, if lower, at the present value of the minimum lease payments. The corresponding liability to the lessor is included in the consolidated statements of financial position as a finance lease obligation.

Lease payments are apportioned between finance expenses and reduction of the lease obligation so as to achieve a constant rate of interest on the remaining balance of the liability. Finance expenses are recognized immediately in profit or loss, unless they are directly attributable to qualifying assets, in which case, they are capitalized in accordance with the Group's general policy on borrowing costs. Contingent rentals are recognized as expenses in the periods in which they are incurred.

Operating lease payments are recognized as an expense on a straight-line basis over the lease term, except where another systematic basis is more representative of the time pattern in which economic benefits from the leased asset are consumed. Contingent rentals arising under operating leases are recognized as an expense in the period in which they are incurred.

In the event that lease incentives are received to enter into operating leases, such incentives are recognized as a liability. The aggregate benefit of incentives is recognized as a reduction of rental expense on a straight-line basis, except where another systematic basis is more representative of the time pattern in which economic benefits from the leased asset are consumed.

2-2) The Group as lessor

Amounts due from lessees under finance leases are recognized as receivables at the amount of the Group's net investment in the leases. Finance lease income is allocated to accounting periods so as to reflect a constant periodic rate of return on the Group's net investment outstanding in respect of the leases.

Rental income from operating leases is recognized on a straight-line basis over the term of the relevant lease. Initial direct costs incurred in negotiating and arranging an operating lease are added to the carrying amount of the leased asset and recognized on a straight-line basis over the lease term.

(9) Foreign currencies

The individual financial statements of each group entity are presented in the currency of the primary economic environment in which the entity operates (its functional currency). For the purpose of the consolidated financial statements, the results of operations and financial position of each group entity are expressed in Korean won, which is the functional currency of the entity and the presentation currency for the consolidated financial statements.

In preparing the consolidated financial statements of the individual Group entities, transactions in currencies other than the entity's functional currency (foreign currencies) are recognized at the rates of exchange prevailing at the dates of the transactions. At the end of each reporting period, monetary items denominated in foreign currencies are retranslated at the rates prevailing at that date. Non-monetary items carried at fair value that are denominated in foreign currencies are retranslated at the rates prevailing at the date when the fair value was determined. Non-monetary items that are measured in terms of historical cost in a foreign currency are not retranslated.

Exchange differences are recognized in profit or loss in the period in which they arise, except for:

- Exchange differences on foreign currency borrowings related to assets under construction for future productive use, which are included in the cost of those assets when they are regarded as an adjustment to interest costs on those foreign currency borrowings;
- Exchange differences on transactions entered into in order to hedge certain foreign currency risks; and
- Exchange differences on monetary items receivable from or payable to a foreign operation for which settlement is neither planned nor likely to occur (therefore forming part of the net investment in the foreign operation), which are recognized initially in OCI and reclassified from equity to profit or loss on disposal or partial disposal of the net investment.

For the purpose of presenting consolidated financial statements, the assets and liabilities of the Company's foreign operations are expressed in Korean won using exchange rates prevailing at the end of the reporting period. Income and expense items are translated at the average exchange rates for the period, unless exchange rates fluctuated significantly during that period, in which case, the exchange rates at the dates of the transactions are used. Exchange differences arising, if any, are recognized in OCI and accumulated in a foreign exchange translation reserve (attributed to non-controlling interests as appropriate).

On the disposal of a foreign operation (i.e., a disposal of the Group's entire interest in a foreign operation, a disposal involving loss of control over a subsidiary that includes a foreign operation or a partial disposal of an interest in a joint arrangement or an associate that includes a foreign operation of which the retained interest becomes a financial asset), all of the accumulated exchange differences in respect of that operation attributable to the owners of the Group are reclassified to profit or loss.

In case of a partial disposal (i.e., no loss of control) of a subsidiary that includes a foreign operation, the proportionate share of accumulated exchange differences is reattributed to non-controlling interests in equity and is not recognized in profit or loss. For all other partial disposals (i.e., partial disposals of associates or joint arrangements that do not result in the Group's losing significant influence or joint control), the proportionate share of the accumulated exchange differences is reclassified to profit or loss.

Goodwill and fair value adjustments arising on the acquisition of a foreign operation are treated as assets and liabilities of the foreign operation and translated at the closing rate. Exchange differences arising are recognized in equity.

(10) Government grants

Government grants are not recognized until there is a reasonable assurance that the Group will comply with the conditions attached to them and that the grants will be received.

The benefit of a government loan at a below-market rate of interest is treated as a government grant, measured as the difference between proceeds received and the fair value of the loan based on prevailing market interest rates.

Government grants related to assets are presented in the consolidated statements of financial position by deducting the grant from the carrying amount of the asset (including property, plant and equipment). The related grant is recognized in profit or loss over the life of a depreciable asset as a reduced depreciation expense.

Government grants related to income are recognized in profit or loss on a systematic basis over the periods in which the Group recognizes as expenses the related costs for which the grants are intended to compensate. Government grants that are receivable as compensation for expenses or losses already incurred or for the purpose of giving immediate financial support to the Group with no future related costs are recognized in profit or loss in the period in which they become receivable.

Government grants towards staff re-training costs are recognized as income over the periods necessary to match them with the related costs and are deducted in reporting the related expense.

(11) Retirement benefit costs and termination benefit

The Group concurrently operates defined contribution retirement benefit plans and defined benefit retirement benefit plans.

Contributions to defined contribution retirement benefit plans are recognized as an expense when employees have rendered service entitling them to the contributions.

For defined benefit retirement benefit plans, the cost of providing benefits is determined using the projected unit credit method, with actuarial valuations being carried out at the end of each annual reporting period. Remeasurements comprising actuarial gains and losses, the effect of the asset ceiling (if applicable) and the return on plan assets (excluding interest) are recognized immediately in the consolidated statements of financial position with a charge or credit to the consolidated statements of comprehensive income in the period in which they occur. Remeasurements recognized in the consolidated statements of comprehensive income are not reclassified. Past service cost is recognized in profit or loss in the period of a plan amendment. Net interest is calculated by applying a discount rate to the net defined benefit liability or asset. Defined benefit costs are composed of service cost (including current service cost, past service cost, as well as gains and losses on curtailments and settlements), net interest expense (income) and remeasurement.

The Group presents the service cost and net interest expense (income) components in profit or loss, and the remeasurement component in OCI. Curtailment gains and losses are accounted for as past service costs.

The retirement benefit obligation recognized in the consolidated statements of financial position represents the actual deficit or surplus in the Group's defined benefit plans. Any surplus resulting from this calculation is limited to the present value of any economic benefits available in the form of refunds from the plans or reductions in future contributions to the plans. Discretionary contributions made by employees or third parties reduce service cost upon payment of these contributions to the plan. When the formal terms of the plans specify that there will be contributions from employees or third parties, the accounting depends on whether the contributions are linked to service as follows:

A liability for a termination benefit is recognized at the earlier of when the entity can no longer withdraw the offer of the termination benefit and when the entity recognizes any related restructuring costs.

Discretionary contributions made by employees or third parties reduce service cost upon payment of these contributions to the plan. When the formal terms of the plans specify that there will be contributions from employees or third parties, the accounting depends on whether the contributions are linked to service as follows:

- If the contributions are not linked to services (e.g., contributions are required to reduce a deficit arising from losses on plan assets or from actuarial losses), they are reflected in the remeasurement of the net defined benefit liability (asset).

- If contributions are linked to services, they reduce service costs. For the amount of contribution that is dependent on the number of years of service, the entity reduces service cost by attributing the contributions to periods of service using the attribution method required by K-IFRS 1019 paragraph 70 for the gross benefits. For the amount of contribution that is independent of the number of years of service, the entity reduces service cost in the period in which the related service is rendered.

(12) Taxation

Income tax expense represents the sum of the tax currently payable and deferred tax.

1) Current tax

The tax currently payable is based on taxable profit for the year. Taxable profit differs from profit as reported in the consolidated statements of comprehensive income because of items of income or expense that are taxable or deductible in other years and items that are never taxable or deductible. 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.

A provision is recognized for those matters for which the tax determination is uncertain but it is considered probable that there will be a future outflow of funds to a tax authority. The provisions are measured at the best estimate of the amount expected to become payable. The assessment is based on the judgement of tax professionals within the Company supported by previous experience in respect of such activities and in certain cases based on specialist independent tax advice.

2) Deferred tax

Deferred tax is the tax expected to be payable or recoverable on differences between the carrying amounts of assets and liabilities in the financial statements and the corresponding tax bases used in the computation of taxable profit, and is accounted for using the liability method. Deferred tax liabilities are generally recognized for all taxable temporary differences. Deferred tax assets are generally recognized for all deductible temporary differences to the extent it is probable that taxable profits will be available against which those deductible temporary differences can be utilized. Such deferred tax assets and liabilities are not recognized if the temporary difference arises from goodwill or from the initial recognition (other than in a business combination) of other assets and liabilities in a transaction that affects neither the taxable profit nor the accounting profit.

Deferred tax liabilities are recognized for taxable temporary differences associated with investments in subsidiaries and associates, and interests in joint ventures, except where the Group is able to control the reversal of the temporary difference and it is probable that the temporary difference will not reverse in the foreseeable future. Deferred tax assets arising from deductible temporary differences associated with such investments and interests are only recognized to the extent it is probable that there will be sufficient taxable profits against which the benefits of the temporary differences can be utilized, and they are expected to reverse in the foreseeable future.

The carrying amount of deferred tax assets is reviewed at the end of each reporting period and reduced to the extent it is no longer probable that sufficient taxable profits will be available to allow all or part of the asset to be recovered. 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 substantively enacted by the end of the reporting period. The measurement of deferred tax liabilities and assets reflects the tax consequences that would follow from the manner in which the Group expects, at the end of the reporting period, to recover or settle the carrying amount of its assets and liabilities.

Deferred tax assets and liabilities are offset if, and only if, the Group has a legally enforceable right to set off current tax assets against current tax liabilities and the deferred tax assets and liabilities relate to income taxes levied by the same taxation authority on either the same taxable entity or different taxable entities that intend either to settle current tax liabilities and assets on a net basis or to realize the assets and settle the liabilities simultaneously in each future period in which significant amounts of deferred tax liabilities or assets are expected to be settled or recovered.

For the purpose of measuring deferred tax liabilities and deferred tax assets for investment properties that are measured using the fair value model, the carrying amounts of such properties are presumed to be recovered entirely through sale, unless the presumption is rebutted. The presumption is rebutted when the investment property is depreciable and is held within a business model whose objective is to consume substantially all of the economic benefits embodied in the investment properties over time, rather than through sale.

3) Current and deferred taxes for the year

Current and deferred taxes are recognized in profit or loss, except when they relate to items that are recognized in OCI or directly in equity, in which case, the current and deferred taxes are also recognized in OCI or directly in equity. Where current tax or deferred tax arises from the initial accounting for a business combination, the tax effect is included in the accounting for the business combination.

4) Uncertainty over Income Tax Treatments

The Group’s corporate tax receivable of ₩163,936 million relates to management’s assessment of the amount of tax refund on open tax positions where the assets remain to be agreed with tax authority. Uncertain tax items for which a receivable of ₩163,936 million is made, relate principally to the interpretation of tax legislation regarding arrangements entered into by the Group. Due to the uncertainty associated with such tax items, there is a possibility that, on conclusion of open tax matters at a future date, the final outcome may differ significantly.

(13) Property and equipment

Property and equipment are stated at cost, less subsequent accumulated depreciation and accumulated impairment losses. The cost of an item of property and equipment is directly attributable to their purchase or construction, which includes any costs directly attributable to bringing the asset to the location and the condition necessary for it to be capable of operating in the manner intended by management. It also includes the initial estimate of the costs of dismantling and removing the item and restoring the site on which it is located.

Subsequent costs are recognized in the carrying amount of an asset or 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. Routine maintenance and repairs are expensed as incurred.

The Group does not depreciate land. Depreciation expense is computed using the straight-line method based on the estimated useful lives of the assets as follows:

	Useful lives (Years)
Buildings	20–40
Machinery and equipment	4–6
Others	4

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

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

An item of property and equipment is derecognized upon disposal or when no future economic benefits are expected to arise from the continued use of the asset. Any gain or loss arising on derecognition of the property and equipment (calculated as the difference between the net disposal proceeds and the carrying amount of the asset) is included in profit or loss in the period in which the property and equipment is derecognized.

(14) Intangible assets

1) Intangible assets acquired separately

Intangible assets with finite useful lives that are acquired separately are carried at cost, less accumulated amortization and accumulated impairment losses. Amortization is recognized on a straight-line basis over their estimated useful lives. The estimated useful life and amortization method are reviewed at the end of each reporting period, with the effect of any changes in estimate being accounted for on a prospective basis. Intangible assets with indefinite useful lives that are acquired separately are carried at cost, less accumulated impairment losses.

2) Internally generated intangible assets - research and development expenditure

Expenditure on research activities is recognized as an expense in the period in which it is incurred.

An internally generated intangible asset arising from development (or from the development phase of an internal project) is recognized if, and only if, all of the following conditions have been demonstrated:

- The technical feasibility of completing the intangible asset so that it will be available for use or sale;
- The intention to complete the intangible asset and use or sell it;
- The ability to use or sell the intangible asset;
- How the intangible asset will generate probable future economic benefits;
- The availability of adequate technical, financial and other resources to complete the development and to use or sell the intangible asset; and
- The ability to measure reliably the expenditure attributable to the intangible asset during its development.

The amount initially recognized for internally generated intangible assets is the sum of the expenditure incurred from the date when the intangible asset first meets the recognition criteria. Where no internally generated intangible asset can be recognized, development expenditure is recognized in profit or loss in the period in which it is incurred. Subsequent to initial recognition, internally generated intangible assets are reported at cost, less accumulated amortization and accumulated impairment losses, on the same basis as intangible assets that are acquired separately.

3) Intangible assets acquired in a business combination

Intangible assets that are acquired in a business combination are recognized separately from goodwill and are initially recognized at their fair value at the acquisition date (which is regarded as their cost). Subsequent to initial recognition, intangible assets acquired in a business combination are reported at cost, less accumulated amortization and accumulated impairment losses, on the same basis as intangible assets that are acquired separately.

4) Derecognition of intangible assets

An intangible asset is derecognized on disposal or when no future economic benefits are expected from its use. Gains or losses arising from derecognition of an intangible asset, measured as the difference between the net disposal proceeds and the carrying amount of the asset, are recognized in profit or loss when the asset is derecognized.

5) Patents and trademarks

Patents and trademarks are measured initially at purchase cost and are amortized on a straight-line basis over their estimated useful lives.

(15) Impairment of property and equipment and intangible assets other than goodwill

At the end of each reporting period, the Group reviews the carrying amounts of its property and equipment and intangible assets to determine whether there is any indication that those assets have suffered an impairment loss. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss (if any). When it is not possible to estimate the recoverable amount of an individual asset, the Group estimates the recoverable amount of the CGU to which the asset belongs. Where a reasonable and consistent basis of allocation can be identified, corporate assets are also allocated to individual CGUs, or otherwise, they are allocated to the smallest group of CGUs for which a reasonable and consistent allocation basis can be identified.

Intangible assets with indefinite useful lives and intangible assets not yet available for use are tested for impairment at least annually and whenever there is an indication that an asset may be impaired.

Recoverable amount is the higher of fair value, less costs to sell, or value in use. If the recoverable amount of an asset (or a CGU) is estimated to be less than its carrying amount, the carrying amount of the asset (or the CGU) is reduced to its recoverable amount and the reduced amount is recognized in profit or loss.

Where an impairment loss subsequently reverses, the carrying amount of the asset (or the CGU) is increased to the revised estimate of its recoverable amount, so that the increased carrying amount does not exceed the carrying amount that would have been determined had no impairment loss been recognized for the asset (or the CGU) in prior years. A reversal of an impairment loss is recognized immediately in profit or loss.

(16) Inventories

Inventories are stated at the lower of cost or net realizable value. Costs of inventories, except for those in transit, are measured using the average method and consist of the purchase price, cost of conversion and other costs incurred in bringing the inventories to their present location and condition. Net realizable value represents the estimated selling price for inventories, less all estimated costs of completion and costs necessary to make the sale.

When inventories are sold, the carrying amount of those inventories is recognized as an expense (cost of sales) in the period in which the related revenue is recognized. The amount of any write-down of inventories to net realizable value and all losses of inventories are recognized as an expense in the period the write-down or loss occurs. The amount of any reversal of any write-down of inventories, arising from an increase in net realizable value, is recognized as a reduction in the amount of inventories recognized as an expense in the period in which the reversal occurs.

(17) Provisions

Provisions are recognized when the Group has a present obligation (legal or constructive) as a result of a past event, it is probable that the Group will be required to settle the obligation and a reliable estimate can be made of the amount of the obligation.

The amount recognized as a provision is the best estimate of the consideration required to settle the present obligation at the end of the reporting period, taking the risks and uncertainties surrounding the obligation into account. When a provision is measured using the cash flows estimated to settle the present obligation, its carrying amount is the present value of those cash flows (where the effect of the time value of money is material). The discount rate used is a pretax rate that reflects current market assessments of the time value of money and the risks specific to the liability. Where discounting is used, the increase in the provision due to the passage is recognized in profit or loss as borrowing cost.

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.

At the end of each reporting period, the remaining provision balance is reviewed and assessed to determine if the current best estimate is being recognized. If the existence of an obligation to transfer economic benefit is no longer probable, the related provision is reversed during the period.

(18) Financial instruments

Financial assets and financial liabilities are recognized in the Group's consolidated statements of financial position when the Group becomes a party to the contractual provisions of the instrument. Financial assets and financial liabilities are initially measured at fair value. Transaction costs that are directly attributable to the acquisition or issue of financial assets and financial liabilities (other than financial assets and financial liabilities at FVPL) are added to or deducted from the fair value of the financial assets or financial liabilities, as appropriate, on initial recognition. Transaction costs directly attributable to the acquisition of financial assets or financial liabilities at FVPL are recognized immediately in profit or loss.

(19) Financial assets

All regular-way purchases or sales of financial assets are recognized and derecognized on a trade-date basis. Regular-way purchases or sales are purchases or sales of financial assets that require delivery of assets within the time frame established by regulation or convention in the marketplace.

All recognized financial assets are measured subsequently in their entirety at either amortized cost or fair value, depending on the classification of the financial assets.

1) Classification of financial assets

Debt instruments that meet the following conditions are measured subsequently at amortized cost:

- The financial asset is held within a business model whose objective is to hold financial assets in order to collect contractual cash flows; and
- The contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

Debt instruments that meet the following conditions are measured subsequently at FVOCI:

- The financial asset is held within a business model whose objective is achieved by both collecting contractual cash flows and selling the financial assets; and
- The contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

By default, all other financial assets are measured subsequently at FVPL.

Despite the foregoing, the Group may make the following irrevocable election/designation at initial recognition of a financial asset:

- The Group may irrevocably elect to present subsequent changes in fair value of an equity investment in OCI if certain criteria are met (see (1-3) below); and
- The Group may irrevocably designate a debt investment that meets the amortized cost or FVOCI criteria as measured at FVPL if doing so eliminates or significantly reduces an accounting mismatch (see (1-4) below).

1-1) Amortized cost and effective interest method

The effective interest method is a method of calculating the amortized cost of a debt instrument and of allocating interest income over the relevant period. For financial assets other than purchased or originated credit-impaired financial assets (i.e., assets that are credit impaired on initial recognition), the effective interest rate is the rate that exactly discounts estimated future cash receipts (including all fees and points paid or received that form an integral part of the effective interest rate, transaction costs and other premiums or discounts) excluding ECL, through the expected life of the debt instrument, or, where appropriate, a shorter period, to the gross carrying amount of the debt instrument on initial recognition. For purchased or originated credit-impaired financial assets, a credit-adjusted effective interest rate is calculated by discounting the estimated future cash flows, including ECL, to the amortized cost of the debt instrument on initial recognition.

The amortized cost of a financial asset is the amount at which the financial asset is measured at initial recognition minus the principal repayments, plus the cumulative amortization using the effective interest method of any difference between that initial amount and the maturity amount, adjusted for any loss allowance. The gross carrying amount of a financial asset is the amortized cost of a financial asset before adjusting for any loss allowance.

Interest income is recognized using the effective interest method for debt instruments measured subsequently at amortized cost and at FVOCI. For financial assets other than purchased or originated credit-impaired financial assets, interest income is calculated by applying the effective interest rate to the gross carrying amount of a financial asset, except for financial assets that have subsequently become credit impaired (see below). For financial assets that have subsequently become credit impaired, interest income is recognized by applying the effective interest rate to the amortized cost of the financial asset. If, in subsequent reporting periods, the credit risk on the credit-impaired financial instrument improves so that the financial asset is no longer credit impaired, interest income is recognized by applying the effective interest rate to the gross carrying amount of the financial asset.

For purchased or originated credit-impaired financial assets, the Group recognizes interest income by applying the credit-adjusted effective interest rate to the amortized cost of the financial asset from initial recognition. The calculation does not revert to the gross basis even if the credit risk of the financial asset subsequently improves so that the financial asset is no longer credit impaired.

Interest income is recognized in profit or loss and is included in the "finance income - interest income" line item (see Note 31).

1-2) Debt instruments classified as at FVOCI

Fair value is determined in the manner described in Note 8. The corporate bonds are initially measured at fair value plus transaction costs. Subsequently, changes in the carrying amount of these corporate bonds as a result of foreign exchange gains and losses, impairment gains or losses, and interest income calculated using the effective interest method are recognized in profit or loss. The amounts that are recognized in profit or loss are the same as the amounts that would have been recognized in profit or loss if these corporate bonds had been measured at amortized cost. All other changes in the carrying amount of these corporate bonds are recognized in OCI and accumulated under the heading of investments' revaluation reserve. When these corporate bonds are derecognized, the cumulative gains or losses previously recognized in OCI are reclassified to profit or loss.

1-3) Equity instruments designated as at FVOCI

On initial recognition, the Group may make an irrevocable election (on an instrument-by-instrument basis) to designate investments in equity instruments as at FVOCI. Designation at FVOCI is not permitted if the equity investment is held for trading or if it is contingent consideration recognized by an acquirer in a business combination.

A financial asset is held for trading if:

- it has been acquired principally for the purpose of selling it in the near term; or
- on initial recognition, it is part of a portfolio of identified financial instruments that the Group manages together and has evidence of a recent actual pattern of short-term profit-taking; or
- it is a derivative (except for a derivative that is a financial guarantee contract or a designated and effective hedging instrument).

Investments in equity instruments at FVOCI are initially measured at fair value plus transaction costs. Subsequently, they are measured at fair value with gains and losses arising from changes in fair value recognized in OCI and accumulated in the investments' revaluation reserve. The cumulative gain or loss is not to be reclassified to profit or loss on disposal of the equity investments; instead, it is transferred to retained earnings.
Dividends on these investments in equity instruments are recognized in profit or loss in accordance with K-IFRS 1109, unless the dividends clearly represent a recovery of part of the cost of the investment. Dividends are included in the 'other non-operating income and expenses' line item in profit or loss.

1-4) Financial assets at FVPL

Financial assets that do not meet the criteria for being measured at amortized cost or FVOCI are measured at FVPL. Specifically:

- Investments in equity instruments are classified as at FVPL, unless the Group designates an equity investment that is neither held for trading nor a contingent consideration arising from a business combination as at FVOCI on initial recognition (see (1-3) above).
- Debt instruments that do not meet the amortized cost criteria or the FVOCI criteria (see (1-1) and (1-2) above) are classified as at FVPL. In addition, debt instruments that meet either the amortized cost criteria or the FVOCI criteria may be designated as at FVPL upon initial recognition if such designation eliminates or significantly reduces a measurement or recognition inconsistency (so called 'accounting mismatch') that would arise from measuring assets or liabilities or recognizing the gains and losses on them on different bases. The Group has not designated any debt instruments as at FVPL.

Financial assets at FVPL are measured at fair value at the end of each reporting period, with any fair value gains or losses recognized in profit or loss to the extent they are not part of a designated hedging relationship (see hedge accounting policy). The net gain or loss recognized in profit or loss includes any dividend or interest earned on the financial asset and is included in the 'other non-operating income and expenses' line item (see Note 30). Fair value is determined in the manner described in Note 8.

2) Foreign exchange gains and losses

The carrying amount of financial assets that are denominated in a foreign currency is determined in that foreign currency and translated at the spot rate at the end of each reporting period. Specifically;

- For financial assets measured at amortized cost that are not part of a designated hedging relationship, exchange differences are recognized in profit or loss in the 'Finance income and expenses' line item (see Note 31);
- For debt instruments measured at FVOCI that are not part of a designated hedging relationship, exchange differences on the amortized cost of the debt instrument are recognized in profit or loss in the 'Finance income and expenses' line item (see Note 31). Other exchange differences are recognized in other comprehensive income in the investments' revaluation reserve;
- For financial assets measured at FVPL that are not part of a designated hedging relationship, exchange differences are recognized in profit or loss in the 'Finance income and expenses' line item (see Note 31); and
- For equity instruments measured at FVOCI, exchange differences are recognized in other comprehensive income in the investments' revaluation reserve.

3) Impairment of financial assets

The Group recognizes a loss allowance for ECL on investments in debt instruments that are measured at amortized cost or at FVOCI, lease receivables, trade receivables and contract assets, as well as on financial guarantee contracts. The amount of ECL is updated at each reporting date to reflect changes in credit risk since initial recognition of the respective financial instrument.

The Group always recognizes lifetime ECL for trade receivables, contract assets and lease receivables. The ECLs on these financial assets are estimated using a provision matrix based on the Group's historical credit loss experience, adjusted for factors that are specific to the debtors, general economic conditions and an assessment of both the current as well as the forecast direction of conditions at the reporting date, including time value of money where appropriate.

For all other financial instruments, the Group recognizes lifetime ECL when there has been a significant increase in credit risk since initial recognition. However, if the credit risk on the financial instrument has not increased significantly since initial recognition, the Group measures the loss allowance for that financial instrument at an amount equal to 12-month ECL.

Lifetime ECL represents the ECL that will result from all possible default events over the expected life of a financial instrument. In contrast, 12-month ECL represents the portion of lifetime ECL that is expected to result from default events on a financial instrument that are possible within 12 months after the reporting date.

3-1) Significant increase in credit risk

In assessing whether the credit risk on a financial instrument has increased significantly since initial recognition, the Group compares the risk of a default occurring on the financial instrument at the reporting date with the risk of a default occurring on the financial instrument at the date of initial recognition. In making this assessment, the Group considers both quantitative and qualitative information that is reasonable and supportable, including historical experience and forward-looking information that is available without undue cost or effort. Forward-looking information considered includes the future prospects of the industries in which the Group's debtors operate, obtained from economic expert reports, financial analysts, governmental bodies, relevant think-tanks and other similar organizations, as well as consideration of various external sources of actual and forecast economic information that relate to the Group's core operations.

In particular, the following information is taken into account when assessing whether credit risk has increased significantly since initial recognition:

- An actual or expected significant deterioration in the financial instrument's external (if available) or internal credit rating;
- Significant deterioration in external market indicators of credit risk for a particular financial instrument, for example, a significant increase in the credit spread, the credit default swap prices for the debtor or the length of time or the extent to which the fair value of a financial asset has been less than its amortized cost;
- An actual or expected significant deterioration in the operating results of the debtor;
- Existing or forecast adverse changes in business, financial or economic conditions that are expected to cause a significant decrease in the debtor's ability to meet its debt obligations;
- Significant increases in credit risk on other financial instruments of the same debtor;
- An actual or expected significant adverse change in the regulatory, economic or technological environment of the debtor that results in a significant decrease in the debtor's ability to meet its debt obligations.

Irrespective of the outcome of the above assessment, the Group presumes that the credit risk on a financial asset has increased significantly since initial recognition when contractual payments are more than 30 days past due, unless the Group has reasonable and supportable information that demonstrates otherwise.
Despite the foregoing, the Group assumes that the credit risk on a financial instrument has not increased significantly since initial recognition if the financial instrument is determined to have low credit risk at the reporting date. A financial instrument is determined to have low credit risk if:

(1) The financial instrument has a low risk of default,

(2) The debtor has a strong capacity to meet its contractual cash flow obligations in the near term, and

(3) Adverse changes in economic and business conditions in the longer term may, but will not necessarily, reduce the ability of the borrower to fulfil its contractual cash flow obligations.

The Group considers a financial asset to have low credit risk when the asset has external credit rating of 'investment grade' in accordance with the globally understood definition or if an external rating is not available, the asset has an internal rating of 'performing.' Performing means that the counterparty has a strong financial position and there are no past-due amounts.

For financial guarantee contracts, the date that the Group becomes a party to the irrevocable commitment is considered to be the date of initial recognition for the purposes of assessing the financial instrument for impairment. In assessing whether there has been a significant increase in the credit risk since initial recognition of a financial guarantee contract, the Group considers the changes in the risk that the specified debtor will default on the contract.

The Group regularly monitors the effectiveness of the criteria used to identify whether there has been a significant increase in credit risk and revises them as appropriate to ensure that the criteria are capable of identifying significant increase in credit risk before the amount becomes past due.

3-2) Definition of default

The Group considers the following as constituting an event of default for internal credit risk management purposes, as historical experience indicates that the financial assets that meet either of the following criteria are generally not recoverable:

- When there is a breach of financial covenants by the debtor;

Irrespective of the above analysis, the Group considers that default has occurred when a financial asset is more than 90 days past due, unless the Group has reasonable and supportable information to demonstrate that a more lagging default criterion is more appropriate.

3-3) Credit-impaired financial assets

A financial asset is credit impaired when one or more events that have a detrimental impact on the estimated future cash flows of that financial asset have occurred. Evidence that a financial asset is credit impaired includes observable data about the following events:

(a) Significant financial difficulty of the issuer or the borrower;

(b) A breach of contract, such as a default or past due event (see (3-2) above);

(c) The lender(s) of the borrower, for economic or contractual reasons relating to the borrower's financial difficulty, having granted to the borrower a concession(s) that the lender(s) would not otherwise consider;

(d) It is becoming probable that the borrower will enter bankruptcy or other financial reorganization; or

(e) The disappearance of an active market for that financial asset because of financial difficulties.

3-4) Write-off policy

The Group writes off a financial asset when there is information indicating that the debtor is in severe financial difficulty and there is no realistic prospect of recovery, for example, when the debtor has been placed under liquidation or has entered into bankruptcy proceedings, or in the case of trade receivables, when the amounts are more than two years past due, whichever occurs sooner. Financial assets written off may still be subject to enforcement activities under the Group's recovery procedures, taking into account legal advice where appropriate. Any recoveries made are recognized in profit or loss.

3-5) Measurement and recognition of ECL

The measurement of ECL is a function of the probability of default, loss given default (i.e., the magnitude of the loss if there is a default) and the exposure at default. The assessment of the probability of default and loss given default is based on historical data adjusted by forward-looking information as described above. As for the exposure at default, for financial assets, this is represented by the assets' gross carrying amount at the reporting date; for financial guarantee contracts, the exposure includes the amount drawn down as at the reporting date, together with any additional amounts expected to be drawn down in the future by default date determined based on historical trend, the Group's understanding of the specific future financing needs of the debtors and other relevant forward-looking information.

For financial assets, the ECL is estimated as the difference between all contractual cash flows that are due to the Group in accordance with the contract and all the cash flows that the Group expects to receive, discounted at the original effective interest rate. For a lease receivable, the cash flows used for determining the ECL are consistent with the cash flows used in measuring the lease receivable in accordance with K-IFRS 1116 *Leases*.

For a financial guarantee contract, as the Group is required to make payments only in the event of a default by the debtor in accordance with the terms of the instrument that is guaranteed, the expected loss allowance is the expected payment to reimburse the holder for a credit loss that it incurs, less any amounts that the Group expects to receive from the holder, the debtor or any other party.

If the Group has measured the loss allowance for a financial instrument at an amount equal to lifetime ECL in the previous reporting period, but determines at the current reporting date that the conditions for lifetime ECL are no longer met, the Group measures the loss allowance at an amount equal to 12-month ECL at the current reporting date, except for assets for which simplified approach was used.

The Group recognizes an impairment gain or loss in profit or loss for all financial instruments with a corresponding adjustment to their carrying amount through a loss allowance account, except for investments in debt instruments that are measured at FVOCI, for which the loss allowance is recognized in OCI and accumulated in the investments' revaluation reserve and does not reduce the carrying amount of the financial asset in the consolidated statements of financial position.

4) Derecognition of financial assets

The Group derecognizes a financial asset only when the contractual rights to the cash flows from the asset expire, or when it transfers the financial asset and substantially all the risks and rewards of ownership of the asset to another entity. If the Group neither transfers nor retains substantially all the risks and rewards of ownership and continues to control the transferred asset, the Group recognizes its retained interest in the asset and an associated liability for amounts it may have to pay. If the Group retains substantially all the risks and rewards of ownership of a transferred financial asset, it continues to recognize the financial asset and also recognize a collateralized borrowing for the proceeds received.

On derecognition of a financial asset measured at amortized cost, the difference between the asset's carrying amount and the sum of the consideration received and receivable is recognized in profit or loss. In addition, on derecognition of an investment in a debt instrument classified as at FVOCI, the cumulative gain or loss previously accumulated in the investments' revaluation reserve is reclassified to profit or loss. In contrast, on derecognition of an investment in equity instrument which the Group has elected on initial recognition to measure at FVOCI, the cumulative gain or loss previously accumulated in the investments' revaluation reserve is not reclassified to profit or loss.

(20) Financial liabilities and equity instruments

1) Classification as debt or equity

Debt and equity instruments are classified as either financial liabilities or as equity in accordance with the substance of the contractual arrangement and the definitions of financial liability and an equity instrument.

2) Equity instruments

An equity instrument is any contract that evidences a residual interest in the assets of an entity after deducting all of its liabilities. Equity instruments issued by the Group are recognized at the proceeds received, net of direct issue costs.

Repurchase of the Group's own equity instruments is recognized and deducted directly in equity. No gain or loss is recognized in profit or loss on the purchase, sale, issue or cancellation of the Group's own equity instruments.

3) Financial liabilities

All financial liabilities are measured subsequently at amortized cost using the effective interest method or at FVPL. However, financial liabilities that arise when a transfer of a financial asset does not qualify for derecognition or when the continuing involvement approach applies, and financial guarantee contracts issued by the Group, are measured in accordance with the specific accounting policies set out below.

4) Financial liabilities at FVPL

Financial liabilities are classified as at FVPL when the financial liability is (i) contingent consideration of an acquirer in a business combination, (ii) held for trading or (iii) it is designated as at FVPL.

A financial liability is classified as held for trading if:

- It has been acquired principally for the purpose of repurchasing it in the near term; or
- On initial recognition, it is part of a portfolio of identified financial instruments that the Group manages together and has a recent actual pattern of short-term profit taking; or
- It is a derivative that is not designated and effective as a hedging instrument.

A financial liability other than a financial liability held for trading or contingent consideration of an acquirer in a business combination may be designated as at FVPL upon initial recognition if:

- Such designation eliminates or significantly reduces a measurement or recognition inconsistency that would otherwise arise; or
- The financial liability forms part of a group of financial assets or financial liabilities or both, which is managed, and its performance is evaluated on a fair value basis, in accordance with the Group's documented risk management or investment strategy, and information about the grouping is provided internally on that basis; or
- It forms part of a contract containing one or more embedded derivatives, and K-IFRS 1109 permits the entire combined contract to be designated as at FVPL.

Financial liabilities at FVPL are measured at fair value, with any gains or losses arising on changes in fair value recognized in profit or loss to the extent that they are not part of a designated hedging relationship (see hedge accounting policy). The net gain or loss recognized in profit or loss incorporates any interest paid on the financial liability and is included in the 'other operating income and expenses' line item (see Note 30) in profit or loss.

However, for financial liabilities that are designated as at FVPL, the amount of change in the fair value of the financial liability that is attributable to changes in the credit risk of that liability is recognized in OCI, unless the recognition of the effects of changes in the liability's credit risk in OCI would create or enlarge an accounting mismatch in profit or loss. The remaining amount of change in the fair value of liability is recognized in profit or loss. Changes in fair value attributable to a financial liability's credit risk that are recognized in OCI are not subsequently reclassified to profit or loss; instead, they are transferred to retained earnings upon derecognition of the financial liability.

Gains or losses on financial guarantee contracts issued by the Group that are designated by the Group as at FVPL are recognized in profit or loss.

Fair value is determined in the manner described in Note 8.

5) Financial liabilities measured subsequently at amortized cost

Financial liabilities that are not (i) contingent consideration of an acquirer in a business combination, (ii) held for trading or (iii) designated as at FVPL, are measured subsequently at amortized cost using the effective interest method.

The effective interest method is a method of calculating the amortized cost of a financial liability and of allocating interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments (including all fees and points paid or received that form an integral part of the effective interest rate, transaction costs and other premiums or discounts) through the expected life of the financial liability, or (where appropriate) a shorter period, to the amortized cost of a financial liability.

6) Financial guarantee contracts

A financial guarantee contract is a contract that requires the issuer to make specified payments to reimburse the holder for a loss it incurs because a specified debtor fails to make payments when due in accordance with the terms of a debt instrument.

Financial guarantee contract liabilities are measured initially at their fair values and, if not designated as at FVPL and do not arise from a transfer of an asset, are measured subsequently at the higher of:

- The amount of the loss allowance determined in accordance with K-IFRS 1109 (see financial assets above); and
- The amount recognized initially less, where appropriate, cumulative amortization recognized in accordance with the revenue recognition policies set out above.

7) Foreign exchange gains and losses

For financial liabilities that are denominated in a foreign currency and are measured at amortized cost at the end of each reporting period, the foreign exchange gains and losses are determined based on the amortized cost of the instruments. These foreign exchange gains and losses are recognized in the 'Finance income and expenses' line item in profit or loss (see Note 31) for financial liabilities that are not part of a designated hedging relationship. For those which are designated as a hedging instrument for a hedge of foreign currency risk, foreign exchange gains and losses are recognized in OCI and accumulated in a separate component of equity.

The fair value of financial liabilities denominated in a foreign currency is determined in that foreign currency and translated at the spot rate at the end of the reporting period. For financial liabilities that are measured as at FVPL, the foreign exchange component forms part of the fair value gains or losses and is recognized in profit or loss for financial liabilities that are not part of a designated hedging relationship.

8) Derecognition of financial liabilities

The Group derecognizes financial liabilities when, and only when, its obligations are discharged, canceled or have expired. The difference between the carrying amount of the financial liability derecognized and the consideration paid and payable is recognized in profit or loss.

When the Group exchanges with the existing lender one debt instrument into another one with substantially different terms, such exchange is accounted for as an extinguishment of the original financial liability and the recognition of a new financial liability. Similarly, the Group accounts for substantial modification of terms of an existing liability or part of it as an extinguishment of the original financial liability and the recognition of a new liability. It is assumed that the terms are substantially different if the discounted present value of the cash flows under the new terms, including any fees paid net of any fees received and discounted using the original effective rate, is at least 10 percent different from the discounted present value of the remaining cash flows of the original financial liability. If the modification is not substantial, the difference between: (1) the carrying amount of the liability before the modification and (2) the present value of the cash flows after modification should be recognized in profit or loss as the modification gain or loss within other operating income and expenses.

(21) Accounting treatment related to the emission rights cap and trade scheme

The Group classifies the emission rights as intangible assets. Emission rights allowances that the government allocated free of charge are measured at ₩0, and emission rights allowances purchased are measured at cost, which the Group paid to purchase the allowances. If emission rights allowances that the government allocated free of charge are sufficient to settle the emission rights allowances allotted for the vintage year, the emission liabilities are measured at ₩0. However, for the emission liabilities that exceed the allowances allocated free of charge, the shortfall is measured at the best estimate at the end of the reporting period.

3. CRITICAL ACCOUNTING JUDGMENTS AND KEY SOURCES OF ESTIMATION UNCERTAINTY:

In the application of the Group's accounting policies, which are described in Note 2, management is required to make judgments, estimates and assumptions about the carrying amounts of assets and liabilities that are not readily apparent from other sources. The estimates and associated assumptions are based on historical experience and other factors that are considered to be relevant. Actual results may differ from these estimates.

The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognized in the period in which the estimate is revised if the revision affects only that period or in the period of revision and future periods if the revision affects both the current and the future periods.

The following are the key assumptions concerning the future and other key sources of estimation uncertainty at the end of the reporting period that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year:

(1) Revenue recognition

Revenue from project services is recognized using the percentage-of-completion method, which is recognized based on the costs incurred to date as a percentage to the total estimated costs to be incurred.

(2) Provision for repairs

The Group estimates the related provision for repairs based on historical experience.

(3) Impairment of goodwill

Determining whether goodwill is impaired requires an estimation of the value in use of the CGUs recoverable amount.

(4) Provision for project losses

The Group accrues provision for project losses based on expected amount of project losses.

(5) Net defined benefit liabilities

The present value of net defined benefit liability depends on a number of factors that are determined on an actuarial basis using a number of assumptions, including the discount rate and salary growth.

(6) Uncertainty over Income Tax Treatments

The Group was levied corporate taxes in connection with the goodwill under the merger by the tax authorities in 2016 and paid within the due date. Since then, the Group has filed a suit with the tax authorities as of December 31, 2019, through the proper procedure of disobedience against the tax authorities' decision.
Based on empirical facts such as the case of a third party winning the case and the opinion of the law firm, the Group judged that the amount of tax paid is likely to be refunded and recognized as an asset.

4. SEGMENT REPORTING:

(1) Basis for segmentation

The Group is composed of an IT service division and logistics BPO division, which are its strategic business units. These divisions offer different goods and services and are managed separately because each division requires different technologies and marketing strategies.

The following summary describes the operations of each operating segment:

	Main business
IT service	Reportable segment for IT consulting, IT system design and development SI, clients' information system operation and maintenance, data centers and network service outsourcing.
Logistics BPO	Reportable segment for global logistics IT services, such as supply chain and logistics consulting and solutions.

(2) Financial information for each segment

Financial information for each segment for the years ended December 31, 2019 and 2018, is as follows. Significant accounting policies applied to each reportable segment are the same as the significant accounting policies described in Note 2. Management determines resources to be allocated to each division and reviews based on operating income of each division in order to evaluate performance.

The Group reports segment assets based on property and equipment and intangible assets. Segment liabilities are not reported to the Group's CEO and, therefore, are not disclosed.

1) Segment information

December 31, 2019:

	Korean won (in thousands)				
	Logistics BPO	IT service	Total	Adjustments	Adjusted amounts
Revenue	₩ 5,088,343,809	₩ 6,964,067,103	₩ 12,052,410,912	₩ (1,332,779,108)	₩ 10,719,631,804
Internal revenue	(241,463,861)	(1,091,315,247)	(1,332,779,108)	1,332,779,108	-
External revenue	4,846,879,948	5,872,751,856	10,719,631,804	-	10,719,631,804
Depreciation	7,637,780	153,577,256	161,215,036	49,662,439	210,877,476
Amortization	699,453	63,399,083	64,098,536	23,289,372	87,387,907
Operating profit	71,856,558	921,945,105	993,801,663	(3,712,265)	990,089,397
Non-current assets	25,423,639	1,872,297,155	1,897,720,794	-	1,897,720,794
Acquisition of non-current assets	8,316,205	381,369,022	389,685,227	(11,453,139)	378,232,088

December 31, 2018:

	Korean won (in thousands)				
	Logistics BPO	IT service	Total	Adjustments	Adjusted amounts
Revenue	₩ 4,585,630,071	₩ 6,702,752,115	₩ 11,288,382,186	₩ (1,254,163,285)	₩ 10,034,218,901
Internal revenue	(208,084,671)	(1,046,078,614)	(1,254,163,285)	1,254,163,285	-
External revenue	4,377,545,400	5,656,673,501	10,034,218,901	-	10,034,218,901
Depreciation	6,663,174	202,943,411	209,606,585	(2,586,461)	207,020,124
Amortization	1,469,901	96,581,792	98,051,693	3,197,799	101,249,492
Operating profit	24,030,765	864,695,412	888,726,177	(11,370,364)	877,355,813
Non-current assets	25,809,762	1,887,884,852	1,913,694,614	-	1,913,694,614
Acquisition of non-current assets	6,002,196	282,110,391	288,112,587	(12,485,789)	275,626,798

2) Information on geographical areas

The Group's revenue (based on location) by region for the years ended December 31, 2019 and 2018, is as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Revenue:		
Domestic	₩ 4,919,815,878	₩ 4,810,714,593
America	2,043,414,563	1,770,056,485
Europe	946,369,657	847,509,732
Asia and Africa (*1)	1,775,414,507	1,529,295,495
China	1,034,617,199	1,076,642,596
Total	₩ 10,719,631,804	₩ 10,034,218,901

(*1) Korea and China are excluded.

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Non-current asset (*1):		
Domestic	₩ 1,793,639,285	₩ 1,825,163,478
America	37,106,773	40,940,134
Europe	20,257,883	19,028,192
Asia and Africa (*2)	34,323,059	19,356,530
China	12,393,794	9,206,280
Total	₩ 1,897,720,794	₩ 1,913,694,614

(*1) Financial instruments, investments in associates, deferred tax assets and long-term prepaid expenses are excluded.
(*2) Korea and China are excluded.

(3) Revenues generated from external customer of Samsung Electronics Co., Ltd. and its subsidiaries account for more than 10% of the Group's consolidated revenue, amounting to ₩7,616,564 million and ₩7,134,299 million for the years ended December 31, 2019 and 2018, respectively.

5. CASH AND CASH EQUIVALENTS:

Cash and cash equivalents as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Cash	₩ 5,998	₩ 3,546
Demand deposits	1,148,177,601	1,161,680,451
Total	₩ 1,148,183,599	₩ 1,161,683,997

6. FINANCIAL INSTRUMENTS RESTRICTED AND PLEDGED AS COLLATERAL:

Details of restricted financial instruments and those pledged as collateral as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Short-term financial instruments:		
Deposits related to national project	₩ 226,911	₩ 76,388
Long-term financial instruments:		
Deposits for checking account	17,000	17,000
Deposits for subcontractors (*1)	40,700,000	36,400,000
Others (*2)	15,000	15,000
Total	₩ 40,958,911	₩ 36,508,388

(*1) Deposits restricted in use for financially supporting the Group's subcontractors in agreement with Industrial Bank of Korea.
(*2) Others are subject to withdrawal restrictions in relation to guarantees provided by Seoul Guarantee Insurance Company.

7. CATEGORIES OF FINANCIAL INSTRUMENTS:

(1) Details of categories of financial instruments as of December 31, 2019 and 2018, are as follows:

December 31, 2019:

	Korean won (in thousands)				
	Financial assets measured at amortized cost	FVOCI	FVPL	Total	Fair value
Financial assets:					
Cash and cash equivalents	₩ 1,148,183,599	₩ -	₩ -	₩ 1,148,183,599	₩ 1,148,183,599
Short-term financial instruments	2,682,693,917	-	-	2,682,693,917	2,682,693,917
FVOCI	-	24,599,578	-	24,599,578	24,599,578
FVPL	-	-	7,715,028	7,715,028	7,715,028
Trade receivables, other receivables and other assets (*1)	1,492,078,377	-	-	1,492,078,377	1,492,078,377
Others (*2)	157,255,595	-	-	157,255,595	157,255,595
Total	₩ 5,480,211,488	₩ 24,599,578	₩ 7,715,028	₩ 5,512,526,094	₩ 5,512,526,094

(*1) Other assets, such as short-term loans, long-term loans, are included.
(*2) Others, such as accrued income, deposits provided for guarantees, long-term financial instruments and deposits provided, are included.

	Korean won (in thousands)	
	Financial liabilities measured at amortized cost	Fair value
Financial liabilities:		
Trade and other payables	₩ 618,332,279	₩ 618,332,279
Accrued expense	615,776,421	615,776,421
Lease liabilities	445,675,576	445,675,576
Borrowings and corporate bonds	807,510	807,510
Others (*1)	6,011,317	6,011,317
Total	₩ 1,686,603,103	₩ 1,686,603,103

(*1) Others, such as dividends payable, deposits received and long-term deposits received, are included.

December 31, 2018:

	Korean won (in thousands)				
	Financial assets measured at amortized cost	FVOCI	FVPL	Total	Fair value
Financial assets:					
Cash and cash equivalents	₩ 1,161,683,997	₩ -	₩ -	₩ 1,161,683,997	₩ 1,161,683,997
Short-term financial instruments	2,510,284,470	-	-	2,510,284,470	2,510,284,470
FVOCI	-	22,934,357	-	22,934,357	22,934,357
FVPL	-	-	3,643,123	3,643,123	3,643,123
Trade receivables, other receivables and other assets (*1)	1,503,041,119	-	-	1,503,041,119	1,503,041,119
Others (*2)	132,581,922	-	-	132,581,922	132,581,922
Total	₩ 5,307,591,508	₩ 22,934,357	₩ 3,643,123	₩ 5,334,168,988	₩ 5,334,168,988

(*1) Other assets, such as short-term loans, long-term loans, are included.
(*2) Others, such as accrued income, deposits provided for guarantees, long-term financial instruments and deposits provided, are included.

	Korean won (in thousands)			
	Financial liabilities measured at amortized cost		Fair value	
Financial liabilities:				
Trade and other payables	₩	639,566,939	₩	639,566,939
Accrued expense		582,056,806		582,056,806
Borrowings and corporate bonds		784,724		784,724
Others (*1)		5,256,149		5,256,149
Total	₩	1,227,664,618	₩	1,227,664,618

(*1) Others, such as dividends payable, deposits received and long-term deposits received, are included.

(2) Gain or loss on financial instruments by category

December 31, 2019:

	Korean won (in thousands)	
Financial assets measured at amortized cost:		
Interest income (*1)	₩	81,374,359
Reversal of bad debt expense (bad debt expense)		(2,762,546)
Financial assets measured at fair value:		
Valuation loss on FVOCI		(278,528)
Dividend income		15,900
Valuation gain (loss) on FVPL		(22,812)
Disposal gain (loss) on FVPL		582,362
Financial liabilities measured at amortized cost:		
Interest expense		(15,072,707)
Net gains (losses) on foreign currency transaction		4,900,826
Net foreign exchange gains (losses)		(7,131,217)

(*1) Interest income includes interest income generated by cash and cash equivalents.

December 31, 2018:

	Korean won (in thousands)	
Financial assets measured at amortized cost:		
Interest income (*1)	₩	66,358,435
Reversal of bad debt expense (bad debt expense)		(11,750,893)
Financial assets measured at fair value:		
Valuation gain (loss) on FVOCI (including reclassification, OCI)		10,463,904
Dividend income		15,900
Valuation gain (loss) on FVPL		1,322,631
Disposal gain (loss) on FVPL		-
Financial liabilities measured at amortized cost:		
Interest expense		(1,667,001)
Net gains (losses) on foreign currency transaction		6,016,722
Net foreign exchange gains (losses)		4,308,140

(*1) Interest income includes interest income generated by cash and cash equivalents.

8. FAIR VALUE OF FINANCIAL INSTRUMENTS:

There are no significant changes in the business and economic environment that would affect the fair value of financial assets and liabilities for the year ended December 31, 2019.

(1) Fair value hierarchy

The Group classifies the financial instruments measured at fair value in the consolidated statements of financial position into the following three levels (fair value hierarchy) based on the inputs to valuation techniques used to measure fair value:

- Level 1: Inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities that the Group can access at the measurement date.

- Level 2: Inputs other than quoted prices included within Level 1, that are observable for the asset or liability, either directly (for example, price) or indirectly (for example, derived from price)
- Level 3: Inputs for the asset or liability that are not based on observable market data (unobservable inputs).

Fair value hierarchy of financial instruments subsequently measured at fair value as of December 31, 2019 and 2018, is as follows:

December 31, 2019:

	Korean won (in thousands)			
	Level 1	Level 2	Level 3	Total
FVOCI	₩ -	₩ 22,639,651	₩ 1,959,927	₩ 24,599,578
FVPL	-	3,949,367	3,765,661	7,715,028
Total	₩ -	₩ 26,589,018	₩ 5,725,588	₩ 32,314,606

December 31, 2018:

	Korean won (in thousands)			
	Level 1	Level 2	Level 3	Total
FVOCI	₩ -	₩ 20,524,430	₩ 2,409,927	₩ 22,934,357
FVPL	-	-	3,643,123	3,643,123
Total	₩ -	₩ 20,524,430	₩ 6,053,050	₩ 26,577,480

The above fair values are measured on a recurring basis. The fair value of financial instruments that are not traded in an active market is determined using valuation methods. These valuation techniques maximize the use of observable market data where they are available and rely as little as possible on entity-specific estimates.

If all significant inputs required to measure the fair value of an instrument are observable, the instrument is included in Level 2. There was no significant movement between Level 1 and Level 2 for the year ended December 31, 2019.

If one or more significant inputs are not based on observable market data, the financial instruments are included in Level 3. The fair value of the financial instruments in Level 3 was estimated using the discounted cash flow model.

(2) Changes in financial instruments in Level 3 for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Beginning balance	₩ 6,053,050	₩ 6,811,821
Acquisition	50,498	2,139,165
Disposal	(165)	-
Change	(377,795)	(2,897,936)
Ending balance	₩ 5,725,588	₩ 6,053,050

(3) The valuation process of fair value measurements for major financial instruments categorized as Level 3

The fair value of CVnet Co., Ltd., FVOCI categorized within Level 3 of the fair value hierarchy, was appropriately estimated based on the professional judgment of independent appraisers' reasonable valuation method.

(4) Valuation methods and inputs

Valuation methods and inputs used in the recurring fair value measurements of the long-term FVOCI categorized within Level 3 of the fair value hierarchy as of December 31, 2019, are as follows:

	Korean won (in thousands)				
	Fair value	Level	Valuation method	Inputs	Range of inputs (weighted average)
FVOCI					
CVnet Co., Ltd.	₩ 1,744,800	3	Discounted cash flow	Sales growth rate	3.4%–4.5% (4.1%)
				Pretax discount rate	13.3%

(5) Sensitivity analysis for recurring fair value measurements categorized in Level 3

Sensitivity analysis of financial instruments is performed to measure favorable and unfavorable changes in the fair value of financial instruments that are affected by the unobservable input parameters, using statistical techniques. Financial instruments categorized in Level 3 and subject to sensitivity analysis are equity securities for which changes in the fair value are recognized in OCI.

The sensitivity analysis of OCI in accordance with the variation of the input parameters for the equity securities is as follows:

	Korean won (in thousands)	
	Favorable changes	Unfavorable changes
FVOCI (*1)	₩ 143,400	₩ (123,000)

(*1) Changes in their fair value are calculated as favorable changes and unfavorable changes based on the changes in discount rate that is a significant unobservable input. Favorable changes are the changes by decreasing discount rate by 1.0%. Unfavorable changes are the changes by increasing discount rate by 1.0%.

9. TRADE RECEIVABLES, OTHER RECEIVABLES AND OTHERS:

(1) Details of trade receivables, other receivables and others as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)					
	December 31, 2019			December 31, 2018		
	Trade receivables	Other receivables (*1)	Others	Trade receivables	Other receivables (*1)	Others
Receivables, gross	₩ 1,455,721,597	₩ 51,299,102	₩ 2,852,645	₩ 1,305,368,976	₩ 211,167,342	₩ 2,361,388
Allowances for bad debts	(16,259,856)	(1,535,111)	-	(13,616,568)	(1,910,999)	(139,020)
Receivables, net	₩ 1,439,461,741	₩ 49,763,991	₩ 2,852,645	₩ 1,291,752,408	₩ 209,256,343	₩ 2,222,368

(*1) The service receivables in contract asset, amounting to ₩583,861,317 thousand, ₩496,489,115 thousand as of December 31, 2019 and 2018, are excluded (see Note 27).

(2) Changes in allowance for doubtful accounts of trade and other receivables for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)					
	December 31, 2019			December 31, 2018		
	Trade receivables	Other receivables	Others	Trade receivables	Other receivables	Others
Beginning balance	₩ 13,616,568	₩ 1,910,999	₩ 139,020	₩ 4,596,504	₩ 1,971,071	₩ 2,335,817
(Reversal of) bad debt expense	2,903,555	43,133	5,858	11,613,922	16,966	(69,996)
Receivables written off	(860,248)	(477,760)	(144,878)	(1,849,049)	(87,116)	(2,126,801)
Collection of receivables written off	527	2,544	-	4,743	3,551	-
Others	599,454	56,195	-	(749,552)	6,527	-
Ending balance	₩ 16,259,856	₩ 1,535,111	₩ -	₩ 13,616,568	₩ 1,910,999	₩ 139,020

The recognition of allowances for doubt accounts has been included in selling and administrative expenses and other income in the consolidated statements of comprehensive income (see Notes 29 and 30).

(3) The aging analysis of trade receivables, other receivables and others overdue, but not individually impaired as of December 31, 2019 and 2018, is as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Up to 1 month	₩ 90,042,450	₩ 248,620,879
1 month to 6 months	35,534,069	41,173,955
7 months to 12 months	4,217,648	5,496,030
More than 12 months	4,441,179	8,948,098
Total	₩ 134,235,346	₩ 304,238,962

(4) Details of the Group's individually impaired receivables as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Individually impaired receivables	₩ 17,585,405	₩ 15,573,587

The individually impaired receivables are generally aged more than one year and the debtors are experiencing significant financial difficulty. The Group recorded an additional allowance of ₩210 million and ₩93 million as of December 31, 2019 and 2018, respectively, using historical experience rates based on aging analysis of receivables.

(5) The maximum exposure to credit risk as of December 31, 2019, is the carrying value of each class of receivables.

10. INVENTORIES:

(1) Details of inventories as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Raw materials	₩ 1,702,068	₩ 1,440,066
Merchandise	13,620,593	15,070,250
Goods in transit	510,116	762,687
Supplies	1,648,939	1,488,973
Consigned goods	-	12,439
Total	₩ 17,481,716	₩ 18,774,415

(2) The amount of inventories recognized as expense (cost of sales) and valuation losses on inventories reflected in cost of sales for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Inventories recognized as expenses (cost of sales)	₩ 653,038,519	₩ 576,593,064
Inventories write-down	9,303	2,837,045
Reversals of inventories write-down	(2,001,380)	(1,234,550)

11. ASSETS CLASSIFIED AS HELD FOR SALE:

The Group decided to sell its Gwacheon data center and Daedeok data center, and negotiated with the buyer for the year ended December 31, 2019. The sale of these assets is in accordance with its long-term policy regarding the acquisition of alternative assets. These assets, expected to be sold within 12 months, are classified as held for sale asset group and are presented separately in the consolidated financial statements. The sale values of these assets are expected to be less than the carrying amount of the net assets, and as a result, the Company has recognized the impairment associated with the assets being classified as held for sale. The details of these asset configurations are as follows:

(1) Details of the composition of assets classified as held for sale for the year ended December 31, 2019, are as follows:

December 31, 2019

	Korean won (in thousands)		
	Disposal group 1	Disposal group 2	Total
Land	₩ 43,384,850	₩ 534,038	₩ 43,918,888
Buildings	12,115,150	5,513,962	17,629,112
Book value	₩ 55,500,000	₩ 6,048,000	₩ 61,548,000

(2) Measurement of the fair value of assets classified as held for sale

The fair value of assets (or disposal groups) classified as held for sale was determined based on the amount of contracts the Group has signed with the buyer. The fair value of assets classified as held for sale was ₩55,500 million and ₩6,048 million as of December 31, 2019, respectively, and classified as Level 2 in the fair value hierarchy. The Group recognized an impairment loss of ₩16,444 million and ₩4,158 million for each asset classified as held for sale for the year ended December 31, 2019 (see Note 30).

12. FINANCIAL ASSETS MEASURED AT FAIR VALUE:

(1) Changes in FVPL and FVOCI financial assets (excluding investments in associates) for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)					
	December 31, 2019			December 31, 2018		
	FVOCI	FVPL	Total	FVOCI	FVPL	Total
Beginning balance	₩ 22,934,357	₩ 3,643,123	₩ 26,577,480	₩ 10,331,453	₩ 2,320,327	₩ 12,651,780
Increase	9,273,473	9,658,900	18,932,373	2,139,000	165	2,139,165
Decrease	(7,329,724)	(5,564,183)	(12,893,907)	-	-	-
Valuation	(278,528)	(22,812)	(301,340)	10,463,904	1,322,631	11,786,535
Ending balance	₩ 24,599,578	₩ 7,715,028	₩ 32,314,606	₩ 22,934,357	₩ 3,643,123	₩ 26,577,480

(2) Details of FVPL as of December 31, 2019, and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Capital investment of partnership	₩ 3,765,661	₩ 3,642,223
Unlisted securities	3,949,367	900
Total	₩ 7,715,028	₩ 3,643,123

(3) Details of FVOCI as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Unlisted securities (*1)	₩ 24,599,578	₩ 22,934,357

(*1) The Group makes an irrevocable selection to present in OCI subsequent changes in the fair value of an investment in an equity instrument that is not held for trading at the date of initial application.

1) Listed securities (excluding investments in associates)

The Group does not have listed securities as of December 31, 2019 and 2018.

2) Unlisted securities (excluding investments in associates)

Details of unlisted securities (excluding investments in associates) as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)			
	December 31, 2019			December 31, 2018
	Number of shares owned	Percentage of ownership (%)	Book value	Book value
CVnet Co., Ltd. (*1)	600,000	9.38	₩ 1,744,800	₩ 2,194,800
Others	-	-	22,854,778	20,739,557
Total			₩ 24,599,578	₩ 22,934,357

(*1) The fair value of CVnet Co., Ltd. was appropriately estimated based on the professional judgment of independent appraisers' reasonable valuation method. The fair value was estimated using the discounted cash flow method by the independent appraisers. In estimating the future cash flows, economic indicators and conditions were taken into consideration and it was presumed that there were no significant changes in the business structure of the investee.

(4) Changes in valuation gain (loss) in the above FVOCI in accordance with fair value assessment for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Beginning balance	₩ 13,546,867	₩ 3,180,282
Measurement of fair value	(282,474)	10,366,585
Included in profit or loss	-	-
Ending balance before tax	13,264,393	13,546,867
Income tax effect	(3,636,735)	(3,697,034)
Ending balance after tax	₩ 9,627,658	₩ 9,849,833

13. SUBSIDIARIES:

(1) Subsidiaries as of December 31, 2019 and 2018, are as follows:

December 31, 2019:

			Number of stocks owned by					
Region	Name of subsidiaries	Type of business	Controlling Company	Subsidiary	Total	Ownership(%)	Country	Shares held by subsidiaries (%)
Korea	S-Core Co., Ltd.	Operating system software development	21,347,538	140,912	21,488,450	82.22	Korea	0.54
	Open Hands Co., Ltd.	Software development	20,000	-	20,000	100.00	Korea	-
	Miracom Inc.	System integration service	5,010,297	-	5,010,297	83.62	Korea	-
	MultiCampus Co., Ltd. (*1)	Providing remote education system and contents	2,800,000	-	2,800,000	47.24	Korea	-
	SVIC #31 Investment Partnership	Venture capital	-	-	-	99.00	Korea	-
	SVIC #39 Investment Partnership	Venture capital	-	-	-	99.00	Korea	-
	SECUi Corp.	System software development and supply	6,500,000	-	6,500,000	56.52	Korea	-
America	Samsung SDS Global SCL America, Inc.	Logistics	5,500,000	-	5,500,000	100.00	America	-
	Samsung SDS Latin America Solucoes Em Tecnologia Ltda	System integration service	224,218,200	607,637	224,825,837	100.00	Brazil	0.27
	Samsung SDS Mexico, S.A. de C.V.	System integration service and logistics	-	99	99	99.00	Mexico	99.00
	Language Testing International, Inc. (*1)	Oral proficiency interview computer assessment service	-	115,980	115,980	38.91	America	82.36
	Samsung SDS Global SCL Panama S.A.	Logistics	-	9,999	9,999	99.99	Panama	99.99
	Samsung SDS Global SCL Chile Limitada	Logistics	-	-	-	99.99	Chile	99.99
	Samsung SDS Global SCL Colombia S.A.S.	Logistics	-	10,000	10,000	100.00	Colombia	100.00
	Samsung SDS Global SCL Peru S.A.C.	Logistics	-	9,999	9,999	99.99	Peru	99.99

America			Number of stocks owned by			Owner ship (%)	Country	Shares held by subsidiaries (%)
			Controlling company	Subsidiary	Total			
	Samsung SDS GSCL Canada., Ltd.	Logistics	10,000	-	10,000	100.00	Canada	-
	Samsung SDS Global SCL Latin America Logistica Ltda	Logistics	5,887,266,647	15,954,652	5,903,221,299	100.00	Brazil	0.27
	Samsung SDS America, Inc.	System integration service	8,100,000	-	8,100,000	100.00	America	-
	Neo Express Transportation (NEXT), Inc.	Logistics	449,339	-	449,339	51.00	America	-
	INTE-SDS Logistics S.A. de C.V.	Logistics	4,313,534	-	4,313,534	51.00	Mexico	-
Europe	Samsung SDS Europe, Ltd.	System integration service and logistics	1,000,002	-	1,000,002	100.00	England	-
	Samsung SDS Global SCL Netherlands Cooperatief U.A.	Logistics	-	-	-	100.00	Netherlands	0.01
	Samsung SDS Global SCL Rus Limited Liability Company	Logistics	-	-	-	100.00	Russia	0.01
	Samsung SDS Global SCL Hungary, Kft.	Logistics	-	-	-	100.00	Hungary	-
	Samsung SDS Global SCL Slovakia, S.R.O.	Logistics	-	-	-	100.00	Slovakia	-
	Samsung SDS Global SCL Poland Sp. Z.o.o.	Logistics	9,999	1	10,000	100.00	Poland	0.01
	Samsung GSCL Sweden AB	Logistics	5,800,000	-	5,800,000	100.00	Sweden	-
	Samsung SDS Global SCL France SAS	Logistics	150,000	-	150,000	100.00	France	-
	Samsung SDS Global SCL Baltics, SIA	Logistics	16,000	-	16,000	100.00	Latvia	-
	Samsung SDS Global SCL Italy S.R.L. A Socio Unico	Logistics	100,000	-	100,000	100.00	Italy	-
	Samsung SDS Global Supply Chain Logistics Spain S.L.U.	Logistics	56,000	-	56,000	100.00	Spain	-
	Samsung SDS Global SCL Greece Societe Anonyme	Logistics	19,998	2	20,000	100.00	Greece	0.01
	Samsung SDS Global SCL Germany GmbH	Logistics	-	-	-	100.00	Germany	-
	Samsung SDS Global SCL Austria GmbH	Logistics	-	-	-	100.00	Austria	-
	Samsung SDS Global SCL Romania S.R.L.	Logistics	9,999	1	10,000	100.00	Romania	0.01
Asia	Samsung SDS China Co., Ltd.	System integration service	-	-	-	100.00	China	-
	Samsung IT Services (Beijing) Co., Ltd.	System integration service	-	-	-	100.00	China	-
	Samsung SDS Asia Pacific Pte, Ltd.	System integration service and logistics	31,000,000	-	31,000,000	100.00	Singapore	-
	Samsung SDS Vietnam Co., Ltd. (formerly Samsung SDS GSCL Vietnam Co., Ltd.)	System integration service and logistics	-	-	-	100.00	Vietnam	-
	ALS SDS Joint Stock Company	Logistics	739,500	-	739,500	51.00	Vietnam	-

Region	Name of subsidiaries	Type of business	Number of stocks owned by: Controlling company	Number of stocks owned by: Subsidiary	Number of stocks owned by: Total	Ownership (%)	Country	Shares held by subsidiaries (%)
Asia	Samsung SDS Global SCL Philippines Co., Ltd. Inc.	Logistics	20,999,995	-	20,999,995	99.99	Philippines	-
	Samsung SDS Global SCL Thailand Co., Ltd.	Logistics	879,988	-	879,988	99.99	Thailand	-
	SDS - Acutech Co., Ltd. (*1)	Logistics	109,999	-	109,999	49.99	Thailand	-
	Samsung SDS Global SCL Malaysia SDN. BHD	Logistics	2,099,998	-	2,099,998	99.99	Malaysia	-
	PT. Samsung SDS Global SCL Indonesia (*2)	Logistics	245	-	245	49.00	Indonesia	-
	Samsung SDS Global SCL Hong Kong Co., Ltd.	Logistics	11,691,380	-	11,691,380	100.00	Hong Kong	-
	Samsung Data Systems India Private Limited	Logistics	2,999,999	-	2,999,999	99.99	India	-
	Samsung SDS India Private Limited	System integration service	2,999,999	-	2,999,999	99.99	India	-
	Samsung SDS Global SCL Beijing Co., Ltd.	Logistics	-	-	-	100.00	China	100.00
	Miracom, Inc. Asia Pacific Ltd.	System integration service	-	5,864,162	5,864,162	83.62	Hong Kong	100.00
	Samsung SDS Global Development Center Xi'an	System integration service	-	-	-	100.00	China	100.00
	Samsung SDS Global SCL Australia Pty., Ltd.	Logistics	1,000	-	1,000	100.00	Australia	-
	SDS Kerry (Shanghai) Supply Chain Solutions Limited (*1)	Logistics	-	-	-	50.00	China	-
	VASCO Supply Chain Solutions Private Limited	Logistics	-	-	-	50.99	India	-
	SDS-MP Logistics Joint Stock Company	Logistics	816,000	-	816,000	51.00	Vietnam	-
Africa	Samsung SDS Global SCL Egypt	Logistics	9,999	-	9,999	99.99	Egypt	-
	Samsung SDS Global SCL South Africa (PTY) Ltd.	Logistics	100	-	100	100.00	South Africa	-
Middle east	Samsung SDS Global SCL Nakliyat ve Lojistik Anonim Sirketi	Logistics	1,000	-	1,000	100.00	Turkey	-
	Samsung SDS Global Supply Chain Logistics Middle East DWC-LLC	Logistics	2,930,000	-	2,930,000	100.00	United Arab Emirates	-

(*1) Although the Group holds less than a majority of the voting rights, it maintains control through a contractual agreement among the shareholders.

(*2) The Group maintains control because all the non-controlling interests are composed of preferred shares without voting rights.

December 31, 2018:

Region	Name of subsidiaries	Type of business	Number of stocks owned by Controlling Company	Subsidiary	Total	Ownership (%)	Country	Shares held by subsidiaries (%)
Korea	S-Core Co., Ltd.	Operating system software development	21,347,538	140,912	21,488,450	82.22	Korea	0.54
	Open Hands Co., Ltd.	Software development	20,000	-	20,000	100.00	Korea	-
	Miracom Inc.	System integration service	5,010,297	-	5,010,297	83.62	Korea	-
	MultiCampus Co., Ltd. (*1)	Providing remote education system and contents	2,800,000	-	2,800,000	47.24	Korea	-
	SVIC #31 Investment Partnership	Venture capital	-	-	-	99.00	Korea	-
	SVIC #39 Investment Partnership	Venture capital	-	-	-	99.00	Korea	-
	SECUi Corp.	System software development and supply	6,500,000	-	6,500,000	56.52	Korea	-
America	Samsung SDS Global SCL America, Inc.	Logistics	5,500,000	-	5,500,000	100.00	America	-
	Samsung SDS Latin America Solucoes Em Tecnologia Ltda	System integration service	224,218,200	607,637	224,825,837	100.00	Brazil	0.27
	Samsung SDS Mexico, S.A. de C.V.	System integration service and logistics	-	99	99	99.00	Mexico	99.00
	Language Testing International, Inc. (*1)	Oral proficiency interview computer assessment service	-	115,980	115,980	38.91	America	82.36
	Samsung SDS Global SCL Panama S.A.	Logistics	-	9,999	9,999	99.99	Panama	99.99
	Samsung SDS Global SCL Chile Limitada	Logistics	-	-	-	99.99	Chile	99.99
	Samsung SDS Global SCL Colombia S.A.S.	Logistics	-	10,000	10,000	100.00	Colombia	100.00
	Samsung SDS Global SCL Peru S.A.C.	Logistics	-	9,999	9,999	99.99	Peru	99.99
	Samsung SDS GSCL Canada., Ltd.	Logistics	10,000	-	10,000	100.00	Canada	-
	Samsung SDS Global SCL Latin America Logistica Ltda	Logistics	5,887,266,647	15,954,652	5,903,221,299	100.00	Brazil	0.27
	Samsung SDS America, Inc.	System integration service	8,100,000	-	8,100,000	100.00	America	-
	Neo Express Transportation (NEXT), Inc.	Logistics	449,339	-	449,339	51.00	America	-
	INTE-SDS Logistics S.A. de C.V.	Logistics	4,313,534	-	4,313,534	51.00	Mexico	-
Europe	Samsung SDS Europe, Ltd.	System integration service	1,000,000	-	1,000,000	100.00	England	-
	Samsung SDS Global SCL Netherlands Cooperatief U.A.	Logistics	-	-	-	100.00	Netherlands	0.01
	Samsung SDS Global SCL Rus Limited Liability Company	Logistics	-	-	-	100.00	Russia	0.01
	Samsung SDS Global SCL Hungary, Kft.	Logistics	-	-	-	100.00	Hungary	-
	Samsung SDS Global SCL Slovakia, S.R.O.	Logistics	-	-	-	100.00	Slovakia	-
	Samsung SDS Global SCL Poland Sp. Z.o.o.	Logistics	9,999	1	10,000	100.00	Poland	0.01
	Samsung SDS Global SCL UK Limited	Logistics	100,000	-	100,000	100.00	England	-
	Samsung GSCL Sweden AB	Logistics	5,800,000	-	5,800,000	100.00	Sweden	-
	Samsung SDS Global SCL France SAS	Logistics	150,000	-	150,000	100.00	France	-
	Samsung SDS Global SCL Baltics, SIA	Logistics	16,000	-	16,000	100.00	Latvia	-
	Samsung SDS Global SCL Italy S.R.L. A Socio Unico	Logistics	100,000	-	100,000	100.00	Italy	-
	Samsung SDS Global Supply Chain Logistics Spain S.L.U.	Logistics	56,000	-	56,000	100.00	Spain	-

Region	Name of subsidiaries	Type of business	Number of stocks owned by Controlling Company	Number of stocks owned by Subsidiary	Number of stocks owned by Total	Ownership (%)	Country	Shares held by subsidiaries (%)
	Samsung GSCL Portugal, Sociedade Unipessoal LDA	Logistics	16,000	-	16,000	100.00	Portugal	-
	Samsung SDS Global SCL Greece Societe Anonyme	Logistics	19,998	2	20,000	100.00	Greece	0.01
	Samsung SDS Global SCL Germany GmbH	Logistics	-	-	-	100.00	Germany	-
	Samsung SDS Global SCL Austria GmbH	Logistics	-	-	-	100.00	Austria	-
	Samsung SDS Global SCL Czech s.r.o.	Logistics	-	-	-	100.00	Czech	-
	Samsung SDS Global SCL Switzerland GmbH	Logistics	2,000	-	2,000	100.00	Switzerland	-
	Samsung SDS Global SCL Romania S.R.L.	Logistics	9,999	1	10,000	100.00	Romania	0.01
Asia	Samsung SDS China Co., Ltd.	System integration service	-	-	-	100.00	China	-
	Samsung IT Services (Beijing) Co., Ltd.	System integration service	-	-	-	100.00	China	-
	Samsung SDS Asia Pacific Pte, Ltd.	System integration service	1,000,000	-	1,000,000	100.00	Singapore	-
	Samsung SDS Global SCL Asia Pacific Pte. Ltd.	Logistics	1,470,000	-	1,470,000	100.00	Singapore	-
	Samsung SDS Vietnam Co., Ltd.	System integration service,	-	-	-	100.00	Vietnam	-
	Samsung SDS Vietnam Co., Ltd. (formerly Samsung SDS GSCL Vietnam Co., Ltd.)	Logistics	-	-	-	100.00	Vietnam	-
	ALS SDS Joint Stock Company	Logistics	739,500	-	739,500	51.00	Vietnam	-
	Samsung SDS Global SCL Philippines Co., Ltd. Inc.	Logistics	20,999,995	-	20,999,995	99.99	Philippines	-
	Samsung SDS Global SCL Thailand Co., Ltd.	Logistics	879,988	-	879,988	99.99	Thailand	-
	SDS - Acutech Co., Ltd. (*1)	Logistics	109,999	-	109,999	49.99	Thailand	-
	Samsung SDS Global SCL Malaysia SDN. BHD	Logistics	2,099,998	-	2,099,998	99.99	Malaysia	-
	PT. Samsung SDS Global SCL Indonesia (*2)	Logistics	245	-	245	49.00	Indonesia	-
	Samsung SDS Global SCL Hong Kong Co., Ltd.	Logistics	11,691,380	-	11,691,380	100.00	Hong Kong	-
	Samsung Data Systems India Private Limited	Logistics	2,999,999	-	2,999,999	99.99	India	-
	Samsung SDS India Private Limited	System integration service	2,999,999	-	2,999,999	99.99	India	-
	Samsung SDS Global SCL Beijing Co., Ltd.	Logistics	-	-	-	100.00	China	100.00
	Miracom, Inc. Asia Pacific Ltd.	System integration service	-	5,864,162	5,864,162	83.62	Hong Kong	100.00
	Miracom, Inc. China Ltd.	System integration service	-	-	-	83.62	China	100.00
	Samsung SDS Global Development Center Xi'an	System integration service	-	-	-	100.00	China	100.00
	Samsung SDS Global SCL Australia Pty., Ltd.	Logistics	1,000	-	1,000	100.00	Australia	-
	SDS Kerry (Shanghai) Supply Chain Solutions Limited (*1)	Logistics	-	-	-	50.00	China	-
	VASCO Supply Chain Solutions Private Limited	Logistics	-	-	-	50.99	India	-
	SDS-MP Logistics Joint Stock Company	Logistics	816,000	-	816,000	51.00	Vietnam	-
Africa	Samsung SDS Global SCL Egypt	Logistics	9,999	-	9,999	99.99	Egypt	-
	Samsung SDS Global SCL South Africa (PTY) Ltd.	Logistics	100	-	100	100.00	South Africa	-

Region	Name of subsidiaries	Type of business	Number of stocks owned by Controlling Company	Subsidiary	Total	Ownership (%)	Country	Shares held by subsidiaries (%)
Middle east	Samsung SDS Global SCL Nakliyat ve Lojistik Anonim Sirketi	Logistics	1,000	-	1,000	100.00	Turkey	-
	Samsung SDS Global Supply Chain Logistics Middle East DWC-LLC	Logistics	2,930,000	-	2,930,000	100.00	United Arab Emirates	-

(*1) Although the Group holds less than a majority of the voting rights, it maintains control through a contractual agreement among the shareholders.

(*2) The Group maintains control because all the non-controlling interests are composed of preferred shares without voting rights.

(2) The financial status of subsidiaries as of and for the years ended December 31, 2019 and 2018, is as follows:

December 31, 2019:

Name of subsidiaries	Korean won (in thousands) Total assets	Total liabilities	Total equity	Revenue	Net profit (loss)
Miracom Inc.	₩ 109,679,931	₩ 44,645,917	₩ 65,034,014	₩ 318,097,897	₩ 14,269,879
MultiCampus Co., Ltd.	192,260,153	89,516,574	102,743,579	274,956,298	17,310,464
SECUi Corp.	147,593,982	31,751,006	115,842,976	119,274,964	5,463,120
Samsung SDS Global SCL America, Inc.	300,160,653	107,301,028	192,859,625	984,874,801	(2,432,922)
Samsung SDS Mexico, S.A. de C.V.	81,052,369	70,866,533	10,185,836	334,890,719	282,574
Samsung SDS Global SCL Latin America Logistica Ltda	76,585,167	37,950,277	38,634,890	136,691,957	4,165,820
Samsung SDS America, Inc.	223,581,633	114,233,312	109,348,321	445,599,826	25,931,731
Samsung SDS Europe, Ltd.	259,120,187	101,058,880	158,061,307	319,353,059	15,835,388
Samsung SDS Global SCL Netherlands Cooperatief U.A.	58,504,460	53,243,597	5,260,863	145,755,601	94,946
Samsung SDS Global SCL Slovakia, S.R.O.	54,794,956	28,004,848	26,790,108	136,467,814	77,058
Samsung SDS Global SCL Poland Sp. Z.o.o.	32,711,943	26,952,528	5,759,415	126,219,312	1,032,061
Samsung SDS China Co., Ltd.	105,934,477	5,979,601	99,954,876	10,312,397	(640,488)
Samsung IT Services (Beijing) Co., Ltd.	161,527,897	99,526,886	62,001,011	299,625,428	24,932,881
Samsung SDS Asia Pacific Pte, Ltd.	160,108,150	67,674,299	92,433,851	139,395,549	4,561,153
Samsung SDS Vietnam Co., Ltd. (formerly Samsung SDS GSCL Vietnam Co., Ltd.)	443,596,039	107,270,559	336,325,480	745,601,123	45,739,125
Samsung SDS Global SCL Thailand Co., Ltd.	70,325,067	23,548,931	46,776,136	237,659,098	5,752,942
Samsung Data Systems India Private Limited	33,070,261	20,844,434	12,225,827	145,972,738	4,695,526
Samsung SDS India Private Limited	81,782,598	48,066,255	33,716,343	102,777,045	9,461,027
Samsung SDS Global SCL Beijing Co., Ltd.	278,958,484	118,697,319	160,261,165	748,249,303	18,888,697

December 31, 2018:

Name of subsidiaries	Korean won (in thousands) Total assets	Total liabilities	Total equity	Revenue	Net profit (loss)
Miracom Inc.	₩ 87,994,322	₩ 34,800,041	₩ 53,194,281	₩ 273,423,947	₩ 14,179,346
MultiCampus Co., Ltd.	135,548,994	45,474,113	90,074,881	228,543,701	16,424,013
SECUi Corp.	139,052,256	27,013,118	112,039,138	107,807,485	7,300,240
Samsung SDS Global SCL America, Inc.	258,648,192	70,009,835	188,638,357	881,119,845	(13,195,292)
Samsung SDS Mexico, S.A. de C.V.	52,192,978	42,972,768	9,220,210	265,836,414	(5,499,221)
Samsung SDS Global SCL Latin America Logistica Ltda	47,228,259	12,648,542	34,579,717	128,196,642	6,220,232
Samsung SDS America, Inc.	145,036,744	64,311,668	80,725,076	373,594,159	18,219,900
Samsung SDS Europe, Ltd.	172,298,600	38,734,362	133,564,238	202,151,110	21,076,625
Samsung SDS Global SCL Netherlands Cooperatief U.A.	35,340,453	30,246,752	5,093,701	129,626,447	682,768
Samsung SDS Global SCL Slovakia, S.R.O.	53,966,509	27,629,194	26,337,315	145,781,814	805,901
Samsung SDS Global SCL Poland Sp. Z.o.o.	30,101,935	25,495,324	4,606,611	113,639,080	473,898
Samsung SDS China Co., Ltd.	110,259,203	11,388,985	98,870,218	33,262,472	347,071
Samsung IT Services (Beijing) Co., Ltd.	191,017,161	154,099,693	36,917,468	313,274,995	25,127,322
Samsung SDS Asia Pacific Pte, Ltd.	94,108,728	45,852,983	48,255,745	86,354,721	2,514,513
Samsung SDS Vietnam Co., Ltd. (formerly Samsung SDS GSCL Vietnam Co., Ltd.)	365,918,143	94,744,416	271,173,727	623,564,729	41,274,047
Samsung SDS Global SCL Thailand Co., Ltd.	60,816,653	24,516,291	36,300,362	197,651,991	3,597,388
Samsung Data Systems India Private Limited	42,680,534	35,168,071	7,512,463	102,071,701	1,628,903
Samsung SDS India Private Limited	66,911,968	42,828,141	24,083,827	82,221,780	2,830,128
Samsung SDS Global SCL Beijing Co., Ltd.	257,049,059	117,906,298	139,142,761	760,722,771	19,719,349

(3) The status of subsidiaries newly excluded in the preparation of the consolidated financial statements for the year ended December 31, 2019, is as follows:

Location	Name of subsidiaries	Reason
Singapore	Samsung SDS Global SCL Asia Pacific Pte. Ltd.	Merged
Vietnam	Samsung SDS Vietnam Co., Ltd.	Merged
China	Miracom, Inc. China Ltd.	Liquidated
Switzerland	Samsung SDS Global SCL Switzerland GmbH	Liquidated
Portugal	Samsung GSCL Portugal, Sociedade Unipessoal LDA	Liquidated
Czech	Samsung SDS Global SCL Czech s.r.o.	Liquidated
UK	Samsung SDS Global SCL UK Limited	Liquidated

14. INVESTMENTS IN ASSOCIATES:

(1) Details of investments in associates as of December 31, 2019 and 2018, are as follows:

			Korean won (in thousands)				
			December 31, 2019			December 31, 2018	
	Location	Main business	Ownership (%)	Acquisition cost	Book value	Ownership (%)	Book value
KOREA INFORMATION CERTIFICATE AUTHORITY, INC. (*1)	Korea	Certification services based for E-commerce	6.42	₩ 1,128,139	₩ 5,276,621	6.42	₩ 5,113,828
DongA.com Co., Ltd. (*2)	Korea	Internet Media Business	18.97	1,306,377	3,645,227	18.97	3,209,014
Dunet, Inc. (*1)	Korea	Providing remote education system and content	18.01	971,068	109,635	18.01	80,877
SERI Technologies, Inc.	Korea	Financial Information System integration	29.00	4,190,500	4,548,138	29.00	4,469,959
iMarket Asia Co., Ltd.	China	Global industrial goods e-commerce	40.56	18,799,534	33,029,262	40.56	31,119,927
CMC Corporation (*3)	Vietnam	IT Service	30.00	54,554,914	52,823,204	-	-
Total				₩ 80,950,532	₩ 99,432,087		₩ 43,993,605

(*1) Although the Group's each ownership of Korea Information Certificate Authority Inc., DongA.Com Co., Ltd. and Dunet Inc. is less than 20%, these investments are classified as investments in associates because the Group can participate in decision making on the financial and operating policies of the investees.
(*2) Due to treasury stock, the effective ratio of shareholding is 20.20%.
(*3) A 30% stake in CMC Corporation was acquired in August of this year by its subsidiary Samsung SDS Asia Pacific Pte, Ltd.

(2) Market price information of the marketable investment in associates owned by the Group as of December 31, 2019, is as follows:

		Korean won (in thousands), VND		
	Number of shares	Market value per share	Market price	Book value
KOREA INFORMATION CERTIFICATE AUTHORITY, INC.	2,000,000 shares	₩ 3,785	₩ 7,570,000	₩ 5,276,621
CMC Corporation	29,999,959 shares	VND 35,900	VND 1,076,998,528	52,823,204

(3) Details of changes in investments in associates accounted for using the equity method for the years ended December 31, 2019 and 2018, are as follows:

December 31, 2019:

	Korean won (in thousands)					
	Beginning balance	Acquisition	Share of profit of associates	Change in associates' equity	Others(*1)	Ending balance
KOREA INFORMATION CERTIFICATE AUTHORITY, INC.	₩ 5,113,828	₩ -	₩ 356,441	₩ (33,648)	₩ (160,000)	₩ 5,276,621
DongA.com Co., Ltd.	3,209,014	-	515,276	(63)	(79,000)	3,645,227
Dunet, Inc.	80,877	-	28,758	-	-	109,635
SERI Technologies, Inc.	4,469,959	-	78,179	-	-	4,548,138
iMarket Asia Co., Ltd	31,119,927	-	1,063,727	845,608	-	33,029,262
CMC Corporation	-	54,554,914	1,040,508	(2,772,218)	-	52,823,204
' **Total**	₩ 43,993,605	₩ 54,554,914	₩ 3,082,889	₩ (1,960,321)	₩ (239,000)	₩ 99,432,087

(*1) Amount changes of investments in associates, due to the change in the dividend.

December 31, 2018:

	Korean won (in thousands)				
	Beginning balance	Share of profit of Associates	Change in associates' equity	Others(*1)	Ending balance
KOREA INFORMATION CERTIFICATE AUTHORITY, INC.	₩ 4,619,156	₩ 594,309	₩ 363	₩ (100,000)	₩ 5,113,828
DongA.com Co., Ltd.	2,895,857	376,435	(78)	(63,200)	3,209,014
Dunet, Inc.	71,447	9,430	-	-	80,877
SERI Technologies, Inc.	4,402,038	67,921	-	-	4,469,959
iMarket Asia Co., Ltd.	28,551,580	1,978,276	590,071	-	31,119,927
Total	₩ 40,540,078	₩ 3,026,371	₩ 590,356	₩ (163,200)	₩ 43,993,605

(*1) Amount changes of investments in associates, due to the change in the dividend.

(4) Summary of financial information of associates for the years ended December 31, 2019 and 2018, is as follows:

December 31, 2019:

	Korean won (in thousands)				
	Total assets	Total liabilities	Total equity	Revenue	Net income (loss)
KOREA INFORMATION CERTIFICATE AUTHORITY, INC.	₩ 104,552,631	₩ 22,329,684	₩ 82,222,947	₩ 41,270,291	₩ 5,675,890
DongA.com Co., Ltd.	24,365,495	5,147,308	19,218,187	23,491,391	2,771,739
Dunet, Inc.	11,224,121	10,615,378	608,743	10,767,037	146,781
SERI Technologies, Inc.	9,683,695	4,555,332	5,128,363	14,922,014	323,028
iMarket Asia Co., Ltd.	126,166,773	61,796,154	64,370,619	471,589,490	3,263,191
CMC Corporation (*1)	229,416,632	121,530,134	107,886,498	88,852,564	5,805,085

(*1) CMC Corporation's revenue and net profit are sales and net profit after the time when the group has significant influence over CMC Corporation.

December 31, 2018:

	Korean won (in thousands)				
	Total assets	Total liabilities	Total equity	Revenue	Net income (loss)
KOREA INFORMATION CERTIFICATE AUTHORITY, INC.	₩ 99,279,326	₩ 19,593,105	₩ 79,686,221	₩ 38,342,344	₩ 9,186,853
DongA.com Co., Ltd.	19,838,875	2,920,465	16,918,410	19,863,732	2,391,331
Dunet, Inc.	11,379,304	10,930,238	449,066	11,348,685	46,603
SERI Technologies, Inc.	8,837,641	3,978,860	4,858,781	16,386,890	192,738
iMarket Asia Co., Ltd.	129,733,369	69,703,832	60,029,537	508,509,747	6,192,827

(5) Reconciliation of the above summarized financial information to the carrying amount of the interest in the associates recognized in the consolidated financial statements:

December 31, 2019:

	Korean won (in thousands)					
	Korea Information Certificate Authority Inc.	DongA.com Co., Ltd.	Dunet, Inc.	SERI Technologies, Inc.	iMarket Asia Co., Ltd.	CMC Corporation
Net assets of associate	₩ 82,222,947	₩ 19,218,187	₩ 608,743	₩ 5,128,363	₩ 64,370,619	₩ 107,886,498
Proportion of the Group's ownership interest in the associate (%)	6.42	18.97	18.01	29.00	40.56	30.00
Amount of the Group's ownership interest in the associate	₩ 5,276,621	₩ 3,645,227	₩ 109,635	₩ 1,487,225	₩ 22,295,829	₩ 29,278,433
Goodwill	-	-	-	3,060,913	10,733,433	23,544,771
Carrying amount of the Group's interest in the associate	₩ 5,276,621	₩ 3,645,227	₩ 109,635	₩ 4,548,138	₩ 33,029,262	₩ 52,823,204

December 31, 2018:

	Korean won (in thousands)				
	Korea Information Certificate Authority Inc.	DongA.com Co., Ltd.	Dunet, Inc.	SERI Technologies, Inc.	iMarket Asia Co., Ltd.
Net assets of associate	₩ 79,686,221	₩ 16,918,410	₩ 449,066	₩ 4,858,781	₩ 60,029,537
Proportion of the Group's ownership interest in the associate (%)	6.42	18.97	18.01	29.00	40.56
Amount of the Group's ownership interest in the associate	₩ 5,113,828	₩ 3,209,014	₩ 80,877	₩ 1,409,046	₩ 20,754,535
Goodwill	-	-	-	3,060,913	10,365,392
Carrying amount of the Group's interest in the associate	₩ 5,113,828	₩ 3,209,014	₩ 80,877	₩ 4,469,959	₩ 31,119,927

15. PROPERTY AND EQUIPMENT:

(1) Details of carrying amounts of property and equipment as of December 31, 2019 and 2018, are as follows:

December 31, 2019:

	Korean won (in thousands)					
	Land	Buildings	Machinery and equipment	Others	Construction in progress	Total
Acquisition costs	₩ 116,226,492	₩ 665,407,464	₩1,559,607,871	₩ 171,333,314	₩ 903,316	₩2,513,478,457
Accumulated depreciation	-	(91,066,558)	(1,192,299,249)	(116,874,444)	-	(1,400,240,251)
Accumulated impairment	-	-	(5,234,565)	-	-	(5,234,565)
Net book value	₩ 116,226,492	₩ 574,340,906	₩ 362,074,057	₩ 54,458,870	₩ 903,316	₩1,108,003,641

December 31, 2018:

	Korean won (in thousands)					
	Land	Buildings	Machinery and equipment	Others	Construction in progress	Total
Acquisition costs	₩ 118,735,985	₩ 582,144,622	₩ 1,593,978,388	₩ 166,835,880	₩ 63,125,596	₩2,524,820,471
Accumulated depreciation	-	(105,562,974)	(1,245,423,646)	(102,564,950)	-	(1,453,551,570)
Accumulated impairment	-	-	(2,543,393)	-	-	(2,543,393)
Net book value	₩ 118,735,985	₩ 476,581,648	₩ 346,011,349	₩ 64,270,930	₩ 63,125,596	₩1,068,725,508

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

December 31, 2019:

	Korean won (in thousands)					
	Land	Buildings	Machinery and equipment	Others	Construction in progress	Total
Beginning balance	₩ 118,735,985	₩ 476,581,648	₩ 346,011,349	₩ 64,270,930	₩ 63,125,596	₩ 1,068,725,508
Acquisition	1,206,188	14,203,371	188,661,957	14,523,657	122,685,084	341,280,257
Transfer	47,339,356	224,906,645	1,916,043	(4,276,214)	(185,483,787)	84,402,043
Asset classified as held for sale transfer	(25,659,932)	(56,490,941)	-	-	-	(82,150,873)
Disposal	-	-	(280,154)	(13,814)	-	(293,968)
Depreciation	-	(17,469,322)	(173,232,556)	(20,175,599)	-	(210,877,477)
Impairment	-	-	(2,691,173)	-	-	(2,691,173)
Others	(25,395,105)	(67,390,495)	1,688,591	129,910	576,423	(90,390,676)
Ending balance	₩ 116,226,492	₩ 574,340,906	₩ 362,074,057	₩ 54,458,870	₩ 903,316	₩ 1,108,003,641

December 31, 2018:

	Korean won (in thousands)					
	Land	Buildings	Machinery and equipment	Others	Construction in progress	Total
Beginning balance	₩ 118,735,985	₩ 492,355,943	₩ 342,447,707	₩ 69,389,892	₩ 5,628,297	₩ 1,028,557,824
Acquisition	-	29,414	176,029,180	13,956,255	58,786,570	248,801,419
Transfer	-	1,093,619	1,182,302	841,806	(1,337,000)	1,780,727
Disposal	-	-	(809,144)	(113,913)	-	(923,057)
Depreciation	-	(16,897,328)	(170,626,084)	(19,496,712)	-	(207,020,124)
Impairment	-	-	(2,543,393)	-	-	(2,543,393)
Others	-	-	330,781	(306,398)	47,729	72,112
Ending balance	₩ 118,735,985	₩ 476,581,648	₩ 346,011,349	₩ 64,270,930	₩ 63,125,596	₩ 1,068,725,508

(3) The Group has comprehensive property insurance for the damage of building, machinery and vehicles up to the loss of ₩1,887,669 million with Samsung Fire & Marine Insurance Co., Ltd. as of December 31, 2019. The Group is also insured with QBE Insurance (International) Ltd. for up to SGD 11 million, Iffco Tokio General Insurance Co., Ltd. for up to INR 396 million, Generali a.s. for up to EUR 1 million, Lockton Philippines Insurance and Oriental Assurance Corporation for up to PHP 801 million, Samsung Liability Insurance Co., Ltd. Beijing branch for up to CNY 117 million, and Wilson Risk Solutions Co. Ltd for up to HKD 4 million.

16. INTANGIBLE ASSETS:

(1) Details of the carrying amounts of intangible assets as of December 31, 2019 and 2018, are as follows:

December 31, 2019:

	Korean won (in thousands)				
	Goodwill	Development costs	Others (*1)	Software	Total
Acquisition cost	₩ 624,328,667	₩ 240,761,073	₩ 381,531,229	₩ 378,798,831	₩ 1,625,582,756
Accumulated amortization	-	(183,569,770)	(280,232,016)	(332,817,621)	(796,619,407)
Accumulated impairment	(34,386,577)	-	(3,679,910)	(1,179,709)	(39,246,196)
Net book value	₩ 590,105,046	₩ 57,191,303	₩ 97,619,303	₩ 44,801,501	₩ 789,717,153

(*1) Others are composed of identifiable intangible assets, such as customer relationships, customer value and technology value obtained upon business mergers, memberships and industrial property rights.

December 31, 2018:

	Korean won (in thousands)				
	Goodwill	Development costs	Others (*1)	Software	Total
Acquisition cost	₩ 624,328,667	₩ 229,255,133	₩ 381,411,281	₩ 363,286,690	₩ 1,598,281,771
Accumulated amortization	-	(157,889,910)	(247,725,029)	(309,349,755)	(714,964,694)
Accumulated impairment	(33,631,803)	-	(3,679,910)	(1,036,258)	(38,347,971)
Net book value	₩ 590,696,864	₩ 71,365,223	₩ 130,006,342	₩ 52,900,677	₩ 844,969,106

(*1) Others are composed of identifiable intangible assets, such as customer relationships, customer value and technology value obtained upon business mergers, memberships and industrial property rights.

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

December 31, 2019:

	Korean won (in thousands)				
	Goodwill	Development costs	Others	Software	Total
Beginning balance	₩ 590,696,864	₩ 71,365,223	₩ 130,006,342	₩ 52,900,677	₩ 844,969,106
Acquisition	-	11,505,307	4,795,944	20,650,579	36,951,830
Transfer	-	-	165,983	(131,667)	34,316
Disposal	-	-	(1,897,560)	(192)	(1,897,752)
Amortization	-	(25,679,860)	(32,920,067)	(28,787,981)	(87,387,908)
Impairment	(754,774)	-	-	(143,451)	(898,225)
Others	162,956	633	(2,531,339)	313,536	(2,054,214)
Ending balance	₩ 590,105,046	₩ 57,191,303	₩ 97,619,303	₩ 44,801,501	₩ 789,717,153

December 31, 2018:

	Korean won (in thousands)				
	Goodwill	Development costs	Others	Software	Total
Beginning balance	₩ 590,505,175	₩ 105,073,730	₩ 165,604,397	₩ 73,676,199	₩ 934,859,501
Acquisition	-	7,867,727	2,073,192	16,884,460	26,825,379
Transfer	-	-	-	(1,653,671)	(1,653,671)
Disposal	-	-	(712)	(3,026)	(3,738)
Amortization	-	(32,669,271)	(33,837,532)	(34,742,689)	(101,249,492)
Impairment	-	(8,907,596)	(3,679,910)	(1,036,258)	(13,623,764)
Others	191,689	633	(153,093)	(224,338)	(185,109)
Ending balance	₩ 590,696,864	₩ 71,365,223	₩ 130,006,342	₩ 52,900,677	₩ 844,969,106

(3) Amortization expenses of intangible assets for the years ended December 31, 2019 and 2018, are presented in the following accounts:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Cost of sales	₩ 41,505,531	₩ 52,031,782
Selling and administrative expenses (*1)	45,882,377	49,217,710
Total	₩ 87,387,908	₩ 101,249,492

(*1) Research and development expenses of ₩1,494 million and ₩1,437 million are included in selling and administrative expenses for the years ended December 31, 2019 and 2018, respectively.

(4) The Group recognized research and development expenses amounting to ₩130,374 million and ₩127,394 million for the years ended December 31, 2019 and 2018, respectively.

(5) Goodwill

Goodwill was allocated to the Group's CGUs (groups) as of December 31, 2019, as follows:

CGU	Korean won (in thousands)
Samsung Networks, Inc.	₩ 417,495,744
MultiCampus Co., Ltd.	42,558,636
Samsung SNS Co., Ltd.	37,428,837
S-CORE CO., Ltd.	19,967,668
Miracom Inc.	8,125,514
EXE C&T Co., Ltd.	7,283,816
SERICEO	6,458,968
Language Testing International, Inc.	4,752,403
SECUi Corp.	43,633,460
Others	2,400,000
Total	₩ 590,105,046

The Group performed an impairment test on goodwill as of December 31, 2019, considering the changes in CGUs for the year ended December 31, 2019. The recoverable amounts of CGUs (groups) have been determined based on their fair value, less costs to sell or value in use. Recoverable amount of MultiCampus Co., Ltd. (formerly Credu Co., Ltd.) was determined based on fair value less cost to sell which was calculated by deducting the per unit disposal cost as of the impairment test date. For CGUs, other than MultiCampus Co., Ltd. (formerly Credu Co., Ltd.), the recoverable amounts were determined based on value in use. Value in use is calculated using cash flow projections based on financial budgets approved by management covering a one-year period. Cash flows beyond the one-year period are extrapolated using the estimated growth rates stated below.

Key assumptions used for value-in-use estimation as of December 31, 2019, are as follows:

	Samsung Networks, Inc.	Samsung SNS Co., Ltd.	EXE C&T Co., Ltd.	SECUi Corp.
Sales growth rate (*1)	2.7%	5.0%-5.2%	4.2%-14.5%	5.2%
Long-term sustainable growth rate (*2)	0.0%	0.0%	0.0%	0.0%
Discount rate (*3)	5.2%	9.4%	12.2%	10.6%

(*1) Weighted-average sales growth rate used to extrapolate cash flows after the budget period was calculated based on experience and GDP growth rate.
(*2) Weighted-average growth rate after five years.
(*3) Discount rate applied to the cash flow projections.

Management determined the gross margin based on historical performance and its expectations of market development. The weighted-average growth rates used are consistent with the industry reports. Discount rates are used to reflect specific risks related to the relevant CGU.

As a result of the impairment test, impairment loss was recognized because the recoverable amount of the multi-campus (formerly Credu., Ltd.) cash-generating unit (group) was less than 755 million won in the carrying amount, and this amount is reflected in other expenses in the consolidated statements of comprehensive income. Impairment loss was not recognized in each cash flow generation unit (group) except the Multicampus Co., Ltd.(formerly Credu., Ltd.) because the recoverable amount exceeds the carrying amount. Impairment loss for Multicampus Co., Ltd. (formerly, Credu., Ltd.) was due to a decrease in the fair value less costs to sell as of the date of the damage assessment.

(6) No impairment loss on development costs is recognized for the year ended December 31, 2019.

(7) Details of development costs as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)		
	December 31, 2019	December 31, 2018	Residual amortization period
Project A	₩ 25,097,321	₩ 34,812,414	3 years
Project B	14,166,994	25,500,590	2 years
Project C	1,954,904	3,187,728	2 years–3 years
Project D	349,404	698,808	1 year
Others	15,622,680	7,165,683	2 years–6 years
Total	₩ 57,191,303	₩ 71,365,223	

There are no projects in the current development stage, and accordingly, no new projects were recognized as development costs. Changes in the carrying amount of the project are amortized on the total development cost.

17. LEASE:

(1) Details of the carrying amounts of right-of-use assets as of December 31, 2019, are as follows:

	Korean won (in thousands)				
	Buildings	Machinery and equipment	Delivery vehicles	Others	Total
Acquisition costs	₩ 501,018,844	₩ 58,937,438	₩ 9,566,011	₩ 13,989,989	₩ 583,512,282
Accumulated Depreciation	(116,261,601)	(25,824,712)	(3,282,330)	(6,910,918)	(152,279,561)
Net book value	₩ 384,757,243	₩ 33,112,726	₩ 6,283,681	₩ 7,079,071	₩ 431,232,721

(2) Changes in the carrying amounts of right-of-use assets as of December 31, 2019, are as follows:

	Korean won (in thousands)				
	Buildings	Machinery and equipment	Delivery vehicles	Others	Total
Beginning Balance	₩ -	₩ -	₩ -	₩ -	₩ -
Acquisition	121,596,079	12,735,288	4,231,795	552,718	139,115,880
Depreciation	(108,693,512)	(25,594,421)	(3,253,060)	(6,849,290)	(144,390,283)
Cumulative effect of accounting change	360,833,552	43,890,485	5,131,401	12,691,835	422,547,273
Others (*1)	11,021,124	2,081,374	173,545	683,808	13,959,851
Ending balance	₩ 384,757,243	₩ 33,112,726	₩ 6,283,681	₩ 7,079,071	₩ 431,232,721

(*1) Others include the increase or decrease due to the exchange rate fluctuation or the replacement of the sub-lease receivables.

The Group leases several assets including buildings, machinery and vehicles. The average lease term is 4.30 years. Legal ownership of leased assets is held by the lessor as collateral for the lease liabilities.

The maturity analysis of lease liabilities is presented in Note 18.

(3) The amounts of lease recognized in profit or loss for the year ended December 31, 2019, are as follows:

	Korean won (in thousands)	
Depreciation of right-of-use assets	₩	144,390,283
Interest expense on lease liabilities		13,277,898
Expense relating to short-term leases or to lease of low-value assets		33,502,556
Income from subleasing right-of-use assets	₩	533,562
Total	₩	191,704,299

The total cash outflow for leases amounts to ₩185,391 million.

18. LEASE LIABILITIES:

(1) Details of the lease liabilities as of December 31, 2019, are as follows:

	Korean won (in thousands)	
Current liabilities	₩	149,950,106
Non-current liabilities		295,725,470
Total	₩	445,675,576

(2) Maturity analysis of the lease liabilities as of December 31, 2019, is as follows:

	Korean won (in thousands)	
Within 1 year	₩	149,950,106
1 to 2 years		105,486,916
2 to 3 years		84,522,015
3 to 4 years		70,041,663
4 to 5 years		28,421,365
More than 5 years		7,253,511
Total	₩	445,675,576

The Group is not exposed a significant liquidity risk with regard to its lease liabilities. Lease liabilities are monitored within the Group’s treasury division. All lease obligations are presented in Korean won.

19. FINANCE LEASE RECEIVABLES:

(1) Details of finance lease asset receivables as of December 31, 2019, are as follows:

	Korean won (in thousands)			
	Undiscounted lease receivables		Net investment in the lease	
Current assets	₩	5,117,116	₩	5,054,606
Non-current assets		17,174,862		16,166,151
Total	₩	22,291,978	₩	21,220,757

During the year, financial lease receivables have increased due to sub-lease to the office for the year ended December 31, 2019.

The Group is not exposed to foreign currency risk as a result of the lease arrangements, as all leases are contracted in Korean won.

(2) Details of finance lease asset receivables as of December 31, 2019, are as follows:

	Korean won (in thousands)	
Within 1 year	₩	5,117,116
1 to 2 years		5,194,484
2 to 3 years		5,273,031
3 to 4 years		5,352,774
4 to 5 years		1,354,574
More than 5 years		-
Undiscounted lease receivables		22,291,979
Addition: unguaranteed residual values		-
Sub-total	₩	22,291,979
Less: unearned finance income		(1,071,222)
Present value of lease receivable		21,220,757
Less: impairment loss allowance		-
Net investment in the lease	₩	21,220,757

(3) The amounts recognized in profit or loss of net investment in the lease from finance lease receivables for the year ended December 31, 2109, are as follows:

	Korean won (in thousands)	
Selling profit or loss	₩	-
Finance income on the net investment in finance leases		561,315
Income relating to variable lease payments not included in the net investment in finance leases		-
Total	₩	561,315

The Group's finance lease arrangements do not include variable receivables. The average effective interest rate contracted approximates 2.29 per cent per annum.

(4) Impairment of finance lease receivables

The managements of the Company estimate the loss allowance on finance lease receivables at the end of the reporting period as an amount equal to lifetime ECL. None of the finance lease receivables as an amount equal to lifetime ECL is past due at the end of the reporting period, and taking into account the historical default experience and the future prospects of the industries in which the lessees operate, together with the value of collateral held over these finance lease receivables, the management of the Company considers that no finance lease receivables are impaired.

There has been no change in the estimation techniques or significant assumptions made during the current reporting period in assessing the loss allowance for finance lease receivables.

20. BORROWINGS AND CORPORATE BOND:

Details of borrowings and corporate bond as of December 31, 2019 and 2018, are as follows:

			Korean won (in thousands)			
	Financial institutions	Annual interest rates (%)	December 31, 2019		December 31, 2018	
Short-term borrowings:						
Borrowings	CITIBANK	7.5–8.0	₩	797,510	₩	774,724
Corporate bond:						
Private placed bond	MG Community Credit Cooperatives	2.6	₩	10,000	₩	10,000
	Total		₩	807,510	₩	784,724

21. PROVISIONS:

(1) Details of provisions as of December 31, 2019 and 2018, are as follows:

December 31, 2019:

	Korean won (in thousands)		
	Current	Non-current	Total
Provision for repairs	₩ 8,798	₩ 51,881	₩ 60,679
Provision for project losses	649,678	200,762	850,440
Provision for warranties	1,768,731	-	1,768,731
Asset retirement obligation	-	16,978,368	16,978,368
Others	14,704,687	-	14,704,687
Total	₩ 17,131,894	₩ 17,231,011	₩ 34,362,905

December 31, 2018:

	Korean won (in thousands)		
	Current	Non-current	Total
Provision for repairs	₩ 259,670	₩ 832,883	₩ 1,092,553
Provision for project losses	1,656,559	1,078,967	2,735,526
Provision for warranties	1,516,368	-	1,516,368
Asset retirement obligation	172,664	15,283,333	15,455,997
Provision for business Compensation	690,484	-	690,484
Others	14,334,993	-	14,334,993
Total	₩ 18,630,738	₩ 17,195,183	₩ 35,825,921

(2) The changes in provisions for the years ended December 31, 2019 and 2018, are as follows:

December 31, 2019:

	Korean won (in thousands)				
	Beginning balance	Increase	Utilization	Reversal	Ending balance
Provision for repairs (*1)	₩ 1,092,553	₩ 389,969	₩ -	₩(1,421,843)	₩ 60,679
Provision for project losses	2,735,526	617,758	(1,600,166)	(902,678)	850,440
Provision for warranties (*2)	1,516,368	1,451,525	(84,522)	(1,114,640)	1,768,731
Asset retirement obligation (*3)	15,455,997	1,706,035	(183,664)	-	16,978,368
Provision for business compensation	690,484	-	-	(690,484)	-
Others	14,334,993	591,538	(221,844)	-	14,704,687
Total	₩ 35,825,921	₩ 4,756,825	₩ (2,090,196)	₩ (4,129,645)	₩ 34,362,905

December 31, 2018:

	Korean won (in thousands)				
	Beginning balance	Increase	Utilization	Reversal	Ending balance
Provision for repairs (*1)	₩ 1,196,426	₩ 92,389	₩ -	₩(196,262)	₩ 1,092,553
Provision for project losses	6,921,082	1,110,213	(721,445)	(4,574,324)	2,735,526
Provision for warranties (*2)	1,098,515	899,147	-	(481,294)	1,516,368
Asset retirement obligation (*3)	14,166,314	1,438,674	-	(148,991)	15,455,997
Provision for business compensation	690,484	-	-	-	690,484
Others	13,594,973	758,784	-	(18,764)	14,334,993
Total	₩ 37,667,794	₩ 4,299,207	₩ (721,445)	₩ (5,419,635)	₩ 35,825,921

(*1) The Group makes provisions for estimated costs of project repairs based on historical experience and terms of guarantees.
(*2) The Group makes provisions for estimated costs of future services arising from warranties, exchanges and refunds and repairs based on warranty period (1 year–4 years) and historical rate.
(*3) The Group makes provisions for expected expense to be paid for restoration of leasehold assets to their original condition in the future.

22. RETIREMENT BENEFIT PLANS:

The Group concurrently operates defined contribution retirement benefit plans and defined benefit retirement benefit plans.

(1) Defined contribution retirement benefit plans

Defined contribution retirement benefit plans of ₩7,553 million and ₩5,922 million were recognized as expense in the consolidated statements of comprehensive income for the years ended December 31, 2019 and 2018, respectively. The Group has unpaid contributions of ₩945 million as of December 31, 2019, and has unpaid contributions of ₩455 million as of December 31, 2018.

(2) Defined benefit retirement benefit plans

1) Net defined benefit liabilities (assets) recognized in the consolidated statements of financial position as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Present value of funded defined benefit obligation	₩ 1,182,978,019	₩ 1,024,900,756
Present value of unfunded defined benefit obligation	28,515,234	21,735,966
	1,211,493,253	1,046,636,722
Less: fair value of plan assets	(1,152,366,303)	(1,005,814,522)
Net defined benefit liabilities (assets)	₩ 59,126,950	₩ 40,822,200

2) Changes in net defined benefit liabilities (assets) for the years ended December 31, 2019 and 2018, are as follows:

December 31, 2019:

	Korean won (in thousands)		
	Defined benefit obligation	Fair value of plan assets	Net defined benefit liabilities (assets)
Beginning balance	₩ 1,046,636,722	₩ (1,005,814,522)	₩ 40,822,200
Included in profit or loss:			
Current service cost	105,633,902	-	105,633,902
Past service cost	-	-	-
Interest cost (income)	29,190,248	(26,776,381)	2,413,867
Others	(32,997)	-	(32,997)
	134,791,153	(26,776,381)	108,014,772
Included in OCI:			
Remeasurement elements:			
Actuarial loss (gain) arising from:			
Effect of change in discount rate	34,331,323	-	34,331,323
Financial assumptions	984,104	-	984,104
Demographic assumptions	541,206	-	541,206
Experience adjustment	35,593,578	-	35,593,578
Return on plan assets	-	9,411,460	9,411,460
	71,450,211	9,411,460	80,861,671
Others:			
Contributions paid by the employer	-	(173,280,345)	(173,280,345)
Benefits paid	(43,036,544)	44,563,419	1,526,875
Transfer from affiliates	828,573	(2,888)	825,685
Others	823,138	(467,046)	356,092
	(41,384,833)	(129,186,860)	(170,571,693)
Ending balance	₩ 1,211,493,253	₩ (1,152,366,303)	₩ 59,126,950

December 31, 2018:

	Korean won (in thousands)		
	Defined benefit obligation	Fair value of plan assets	Net defined benefit liabilities (assets)
Beginning balance	₩ 891,299,452	₩ (898,847,921)	₩ (7,548,469)
Included in profit or loss:			
Current service cost	97,536,441	-	97,536,441
Past service cost	7,704	-	7,704
Interest cost (income)	31,608,641	(30,927,727)	680,914
Others	(5,292)	-	(5,292)
	129,147,494	(30,927,727)	98,219,767
Included in OCI:			
Remeasurement elements:			
Actuarial loss (gain) arising from:			
Effect of change in discount rate	54,417,454	-	54,417,454
Financial assumptions	6,556,297	-	6,556,297
Demographic assumptions	3,702,826	-	3,702,826
Experience adjustment	15,119,860	-	15,119,860
Return on plan assets	-	18,611,474	18,611,474
	79,796,437	18,611,474	98,407,911
Others:			
Contributions paid by the employer	-	(139,743,813)	(139,743,813)
Benefits paid	(53,561,176)	45,023,141	(8,538,035)
Transfer from affiliates	-	(53,825)	(53,825)
Business combinations	-	-	-
Others	(45,485)	124,149	78,664
	(53,606,661)	(94,650,348)	(148,257,009)
Ending balance	₩ 1,046,636,722	₩ (1,005,814,522)	₩ 40,822,200

3) The principal actuarial assumptions used as of December 31, 2019 and 2018, are as follows:

	Percentage (%)	
	December 31, 2019	December 31, 2018
Discount rate	1.9–2.9	2.3–3.1
Future salary increases (including inflation rate)	3.8–6.2	3.8–6.2

Assumptions regarding the future mortality rate are based on average life expectancy and published statistics.

4) Details of fair value of plan assets as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)			
	December 31, 2019		December 31, 2018	
	Carrying amounts	Composition (%)	Carrying amounts	Composition (%)
Cash and cash equivalents	₩ 1,149,534,156	99.8	₩ 1,002,980,713	99.7
Others	2,832,147	0.2	2,833,809	0.3
Total	₩ 1,152,366,303	100.0	₩ 1,005,814,522	100.0

5) The sensitivity analysis of the overall defined benefit liability in accordance with changes to the principal assumptions as of December 31, 2019 and 2018, is as follows:

	Korean won (in thousands)				
	December 31, 2019				
	Changes in principal assumption	Effect due to increase in principal assumption		Effect due to decrease in principal assumption	
Discount rate	1.0% point	₩	(76,788,991)	₩	87,062,034
Salary growth rate	1.0% point		84,867,238		(76,466,418)

	Korean won (in thousands)				
	December 31, 2018				
	Changes in principal assumption	Effect due to increase in principal assumption		Effect due to decrease in principal assumption	
Discount rate	1.0% point	₩	(68,646,256)	₩	77,935,658
Salary growth rate	1.0% point		76,271,217		(68,597,214)

Decreases in corporate bond yields will increase defined benefit liabilities, although this will be partially offset by an increase in the value of the plan assets. The most significant risk will be exposed through an increase in defined benefit liabilities.

The above sensitivity analysis is based on a change in an assumption, while holding all other assumptions constant. In practice, this is unlikely to occur, and changes in some of the assumptions may be correlated. The sensitivity of the defined benefit liabilities to changes in principal actuarial assumptions is calculated using the projected unit credit method, the same method applied when calculating the defined benefit obligations recognized in the consolidated statements of financial position.

The methods and types of assumptions used in preparing the sensitivity analysis have not been changed compared to the previous year.

6) Expected contributions to defined benefit plans for the year ending December 31, 2020, amount to ₩119,140 million.

7) The weighted-average duration of the defined benefit obligations as of December 31, 2019, is 4.85–8.32 years.

23. COMMITMENTS AND CONTINGENCIES:

(1) Guarantees

Details of guarantees provided for employees by the Group as of December 31, 2019, are as follows:

	Financial institutions	Korean won (in thousand)	
Guarantee of employees' debt	Woori Bank (*1)	₩	10,000,000

(*1) Guarantees are provided for the employee's housing loan owed to the financial institutions.

(2) Guarantees provided and major commitments

Details of guarantees provided by the Group and major commitments with financial institutions as of December 31, 2019, are as follows:

	Korean won (in thousands),USD,CNY,VND,BDT,KWD,EUR,INR,AUD,MYR,EGP,PEN,TRY,AED				
Financial institutions	Details	Limits		Executed amounts	
KEB Hana Bank	Payment guarantee	USD	15,000,000		-
		CNY	50,000,000		-
Shinhan Bank	Import letter of credit	USD	27,000,000		-
	Bills bought	USD	5,000,000		-
	Payment guarantee	USD	34,299,000	USD	1,213,741
		USD	4,000,000	VND	56,485,400,000
		VND	42,275,000,000	VND	14,449,350,100
		USD	1,309,189	USD	1,309,189
Woori Bank	Payment guarantee	USD	26,000,000	USD	776,000
	Payment guarantee	CNY	1,749,660	CNY	1,749,660
Kookmin Bank	Payment guarantee and import letter of credit	USD	20,000,000		-
				USD	941,153
	Local letter of credit	KRW	5,000,000		-
HSBC	Payment guarantee	USD	10,000,000		-
	Payment guarantee	KWD	1,050,673		-
	Overseas financing guarantee	USD	5,100,000		-
		INR	620,000,000	INR	164,666,109
		AUD	29,000	AUD	29,000
Bank of China	Payment guarantee	USD	18,000,000		-
CITIBANK	Payment guarantee	KWD	1,661,200	KWD	1,661,200
		KWD	525,336	KWD	525,336
		BDT	145,422,500	BDT	145,422,500
	Overseas financing guarantee	USD	58,150,000	EUR	3,067,141
				MYR	322,000
				EGP	25,000
				USD	192,237
				PEN	50,000
				TRY	500,000
China Merchants Bank	Payment guarantee	CNY	270,000,000	CNY	1,655,391
	Overseas financing guarantee	CNY	30,000,000		-
Commerzbank AG	Payment guarantee	EUR	600,000	EUR	378,850
Emirates NBD	Payment guarantee	AED	3,885	AED	3,885

(5) Other commitments

1) The Company entered into general term loan agreements with an aggregate credit limit of ₩20,000 million with Shinhan Bank as of December 31, 2019. In addition, a domestic subsidiary, S-Core Co., Ltd., entered into a general term loan agreement with an aggregate credit limit of ₩3,000 million with Shinhan Bank as of December 31, 2019.

2) The Company has bank overdraft facilities with Woori Bank and three other banks amounting to ₩70,500 million in aggregate, and a domestic subsidiary, Miracom Inc., has bank overdraft facilities with Woori Bank and one other bank amounting to ₩4,800 million in aggregate as of December 31, 2019.

3) The Company has a contractual agreement of business-to-business electronic payment system with KEB Hana Bank and three other banks amounting to ₩52,383 million, with a credit limit of ₩340,000 million as of December 31, 2019.

4) The Company has a comprehensive credit limit with KEB Hana Bank to ₩19,300 million as of December 31, 2019.

5) The Company has been provided a payment guarantee amounting to ₩472,648 million by Korea Software Financial Cooperative and Seoul Guarantee Insurance Company, and in relation to the guarantee, an equity

investment of ₩2,608 million is provided to Korea Software Financial Cooperative as collateral as of December 31, 2019. Domestic subsidiaries of Miracom Inc. and MultiCampus Co., Ltd. are provided with payment guarantees by Korea Software Financial Cooperative amounting to ₩14,948 million and ₩5,001 million, respectively, and each of these subsidiaries has provided equity investment of ₩394 million and ₩210 million, respectively, to Korea Software Financial Cooperative as collateral. In addition, MultiCampus Co., Ltd., SECUi. Corp. and S-Core Co., Ltd. are provided with payment guarantees by Seoul Guarantee Insurance Company amounting to ₩2,487 million, ₩2,552 million and ₩943 million as of December 31, 2019, respectively.

24. SHARE CAPITAL AND PREMIUM:

Under its articles of incorporation, the Group is authorized to issue 200,000,000 common shares with a par value of ₩500 per share, and 50,000,000 shares of participating preferred shares, which are non-voting and are entitled to receive a minimum cash dividend of more than 1% of par value by resolution of the board of directors. In addition, the Group is authorized to issue to investors, other than current shareholders, convertible debentures and debentures with warrants with face values of up to ₩67,000 million, where ₩50,000 million of such debentures is for common shares and the remaining ₩17,000 million is for preferred shares. As of December 31, 2019, 77,377,800 shares are issued and share capital amounts to ₩38,689 million. As of December 31, 2019, there are no issued convertible debentures, debentures with warrants and participating preferred share, which are non-voting.

25. RETAINED EARNINGS:

(1) Retained earnings as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Legal reserve		
Earned surplus reserve (*1)	₩ 19,344,450	₩ 19,344,450
Reserve for business development (*2)	21,000,000	21,000,000
Subtotal	40,344,450	40,344,450
Discretionary reserve		
Reserve for business rationalization (*3)	10,098,807	10,098,807
Subtotal	10,098,807	10,098,807
Unappropriated retained earnings	5,353,061,151	4,771,303,565
Total	₩ 5,403,504,408	₩ 4,821,746,822

(*1) The Commercial Code of the Republic of Korea requires the Group to appropriate, as a legal reserve, an amount equal to a minimum of 10% of cash dividends paid, until such reserve equals 50% of its issued capital stock. This reserve is not available for the payment of cash dividends, but may be transferred to capital stock or used to reduce accumulated deficit, if any, with the ratification of the Group's majority shareholders.

(*2) In accordance with the former corporate income tax law, the Group has accumulated reserves for business development by the amount of retained earnings in excess of accumulated earnings. This amount may be transferred to capital stock or used to reduce accumulated deficit, if any, with the ratification of the Group's majority shareholders.

(*3) Pursuant to the Special Tax Treatment Control Law, the Group is required to appropriate, as a reserve for business rationalization, a portion of retained earnings equal to tax reductions arising from investment and other tax credits. Due to revision made to Korean tax laws during 2002, such reserves are no longer required.

(2) Changes in retained earnings for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Beginning balance	₩ 4,821,746,822	₩ 4,347,047,623
Net income attributable to the owners of the Group	736,457,958	629,399,571
Dividends	(154,700,372)	(154,700,372)
Ending balance	₩ 5,403,504,408	₩ 4,821,746,822

(3) Details of dividends declared for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Number of common shares outstanding	77,350,186 shares	77,350,186 shares
Dividend ratio	480%	400%
Dividends	₩ 185,640,446	₩ 154,700,372

26. OTHER COMPONENTS OF EQUITY:

(1) Details of other components of equity as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Valuation gain (loss) on fair value through OCI	₩ 9,627,658	₩ 9,849,833
Changes in associates' accumulated OCI	719,091	175,980
Changes in associates' accumulated other comprehensive losses	(2,772,218)	(268,785)
Foreign currency translation differences	(63,741,121)	(105,941,898)
Treasury stock	(1,592,531)	(1,592,531)
Other capital adjustment	80,267,165	81,019,032
Remeasurement of defined benefit liability	(216,372,902)	(158,689,196)
Total	₩ (193,864,858)	₩ (175,447,565)

(2) Changes in treasury stock for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)			
	December 31, 2019		December 31, 2018	
	Number of shares	Acquisition cost	Number of shares	Acquisition cost
Beginning balance	27,614 shares	₩ 1,592,531	27,614 shares	₩ 1,592,531
Acquisition	-	-	-	-
Ending balance	27,614 shares	₩ 1,592,531	27,614 shares	₩ 1,592,531

The Group acquired 13,515 shares (at ₩56,406 per share) of treasury stock from shareholders who exercised the appraisal right against the merger of Samsung Networks Co., Ltd., in accordance with the Commercial Code of the Republic of Korea. The Group holds 9,005 common shares due to transfer of treasury shares owned by Samsung Networks Co., Ltd. and 4,197 common shares due to acquisition of fractional shares.

In addition, the Group holds 346 common shares due to transfer of treasury shares owned by Samsung SNS Co., Ltd. and 551 common shares due to acquisition of fractional shares for the year ended December 31, 2013.

The Group intends to dispose of its treasury shares depending on the market conditions.

27. REVENUE:

(1) Breakdown of revenue for the years ended December 31, 2019 and 2018, is as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Sales of goods	₩ 280,030,038	₩ 250,120,482
IT services (*1)	5,592,721,817	5,406,553,019
Logistics BPO	4,846,879,949	4,377,545,400
Total	₩ 10,719,631,804	₩ 10,034,218,901

(*1) Revenue from fixed-price contracts is included.

(2) Details of contract assets and unbilled construction as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Installation of software services, etc.	₩ 583,861,317	₩ 496,679,115
Less: allowance for doubtful accounts	-	(190,000)
Total	₩ 583,861,317	₩ 496,489,115
Current	₩ 583,861,317	₩ 496,489,115
Non-current	-	-
Total	₩ 583,861,317	₩ 496,489,115

(3) Considering past default experience and prospects for the industry to which the customer belongs, management determines that none of other receivables are impaired other than the contract assets.

(4) Details of contract liabilities and advance construction billing as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Installation of software services, etc. (*1)	₩ 92,021,446	₩ 108,499,381
Total	₩ 92,021,446	₩ 108,499,381
Current	₩ 92,021,446	₩ 108,499,381
Non-current	-	-
Total	₩ 92,021,446	₩ 108,499,381

(*1) Contract liabilities relating to software installation services are balances due to customers under contracts. These arise if a particular milestone payment exceeds the revenue recognized to date under the cost-to-cost method.

(5) There are no contract assets or trade receivables in relation to the major contract more than 5% of the Group's revenue in the prior period that is recognized in the current period by the cost-to-cost method for basis of the percentage of total costs incurred to date bear to the estimated total contract costs instruments for the year ended December 31, 2019.

(6) Changes in estimated total contract costs

Applying the cost-to-cost method, which is a basis of the total contract amount and total contract cost associated with a contract that recognize revenue over time, the effects of changes in estimates and changes in those for current and future periods on gains and losses, contract assets and contract liabilities changes are as follows:

	Korean won (in thousands)				
	Change in contract amount	Change in estimated total contract cost	Effect on net income	Effect on future income	Change in Contract assets
Services for installation of software and etc.	₩ 374,093,765	₩ 234,964,544	₩ 8,412,867	₩ 130,716,354	₩ 8,412,867

The impact on current and future periods is calculated based on total estimated contract costs considering events that occurred until December 31, 2019, after the commencement of the contract and the current estimate of total contract revenue as of December 31, 2019. Estimates of total contract revenue and total contract costs may change in future periods.

28. EXPENSES BY NATURE:

Details of expenses by nature for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)			
	December 31, 2019		December 31, 2018	
Changes in inventories and purchase of inventories	₩	653,038,519	₩	576,593,064
Wages and salaries		1,973,831,838		1,888,760,280
Employee welfare		372,098,805		341,767,843
Depreciation and amortization		442,359,736		308,269,617
Advertising		4,449,006		3,197,817
Transportation		2,014,774		2,324,739
Travel		57,532,658		52,013,308
Training		77,405,638		65,694,054
Commission and service charges		398,111,970		519,387,765
Rent		61,247,748		148,973,594
Outsourcing		982,015,900		890,203,631
Communication		184,183,902		193,381,228
Taxes and dues		30,962,719		31,214,370
Logistics		4,338,527,257		3,969,263,775
Royalty expense		328,584		-
Others		151,433,353		165,818,003
Total	₩	9,729,542,407	₩	9,156,863,088

29. SELLING AND ADMINISTRATIVE EXPENSES:

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

	Korean won (in thousands)			
	December 31, 2019		December 31, 2018	
Wages and salaries	₩	384,387,378	₩	354,554,985
Provision for severance indemnities		24,370,872		20,170,390
Employee welfare		81,554,817		76,134,361
Depreciation		52,470,619		19,336,706
Amortization		44,379,886		47,780,421
Repairs and maintenance		2,652,652		2,634,759
Supplies		2,203,671		1,956,450
Utility		1,405,769		1,221,019
Outsourcing		31,222,922		34,965,550
Travel		14,141,701		11,926,881
Communication		1,447,267		1,910,971
Insurance premium		2,395,588		2,363,845
Commission and service charges		35,316,409		33,022,196
Rental		19,523,901		60,102,834
Publication		638,782		597,970
Entertainment		3,690,748		3,492,319
Conference		1,544,767		1,378,932
Training		8,651,672		9,086,570
Recreation		2,166,908		1,505,214
Broadcasting		298,671		24,714
Bad debt		2,912,916		10,314,176
Service charge		278,301		1,841,469
Research and development		70,617,905		72,727,094
Miscellaneous expenses		268,619		369,734
Others		15,296,007		17,613,894
Total	₩	803,838,748	₩	787,033,454

30. OTHER OPERATING INCOME AND EXPENSES:

(1) Details of other operating income for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)			
	December 31, 2019		December 31, 2018	
Commission income	₩	483,898	₩	10,679,999
Dividend income		15,900		15,900
Gains on disposal of FVPL		638,538		-
Valuation gain on FVPL		72,941		1,340,449
Gains on disposal of property and equipment		1,303,642		742,049
Gains on disposal of intangible assets		216,942		2,863
Reversal of allowance for doubtful accounts		147,389		209,683
Others		21,699,765		16,252,786
Total	₩	24,579,015	₩	29,243,729

(2) Details of other operating expenses for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)			
	December 31, 2019		December 31, 2018	
Loss on disposal of FVPL	₩	56,176	₩	-
Valuation loss on FVPL		95,753		17,817
Loss on disposal of property and equipment		65,895		155,509
Impairment loss on property and equipment		2,691,173		2,543,393
Impairment loss on assets classified as held for sale		20,602,874		-
Loss on disposal of intangible assets		9,093		712
Impairment loss on intangible assets		898,225		13,621,577
Other bad debt expense		(2,981)		214,995
Donations		3,395,773		1,972,789
Others		17,722,811		9,584,671
Total	₩	45,534,792	₩	28,111,463

31. FINANCE INCOME AND EXPENSE:

(1) Details of finance income and expenses for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)			
	December 31, 2019		December 31, 2018	
Finance income:				
Interest income				
Amortized cost	₩	81,374,359	₩	66,358,435
Gains on foreign currency transaction		49,056,787		57,595,347
Foreign exchange gains		7,120,860		11,621,991
Total	₩	137,552,006	₩	135,575,773
Finance expense:				
Interest expense				
Amortized cost	₩	15,072,707	₩	1,667,001
Losses on foreign currency transaction		44,155,961		51,578,625
Foreign exchange losses		14,252,078		7,313,851
Total	₩	73,480,746	₩	60,559,477

(2) The Group recognizes the gains and losses from foreign exchange differences as finance income and expenses.

32. INCOME TAX EXPENSE:

(1) The components of income tax expense for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)			
	December 31, 2019		December 31, 2018	
Current income taxes	₩	257,503,422	₩	280,221,815
Additional income taxes for prior years and other		6,916,251		458,600
Deferred income tax arising from temporary differences and other differences		21,419,139		37,058,073
Income tax expense	₩	285,838,812	₩	317,738,488

(2) The actual income tax expense on the Group's profit before tax differs from the amount that is computed using the tax calculated at the weighted-average rate applied to profits for the years ended December 31, 2019 and 2018, as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Profit before income tax	₩ 1,036,287,769	₩ 956,530,746
Income tax based on statutory tax rate	247,714,933	245,872,803
Effective tax rate (*1)	23.90%	25.70%
Adjustments:		
Permanent differences	9,619,791	9,295,182
Tax credit	(30,191,637)	(13,476,211)
Tax credit for which no deferred tax asset was recognized	20,449,847	14,983,294
Adjustment related to investments in subsidiaries	25,527,994	26,418,531
Others (*2)	12,717,885	34,644,889
Income tax expense	₩ 285,838,813	₩ 317,738,488
Effective tax rate	27.58%	33.22%

(*1) The Group's statutory tax rate is applied differently according to the tax authorities as of December 31, 2019 and 2018.
(*2) Other adjustments consist of additional income taxes for prior years and tax effect from tax rate change, etc.

(3) Changes in deferred income tax assets and liabilities resulting from the tax effect of cumulative temporary differences and others for the years ended December 31, 2019 and 2018, are as follows:

December 31, 2019

	Korean won (in thousands)					
	Cumulative temporary differences			Deferred tax assets (liabilities)		
	Beginning	Changes	End	Beginning	Changes	End
Deferred income tax arising from temporary differences:						
Net defined benefit liabilities	₩ (238,476,869)	₩ 244,042,482	₩ 5,565,613	₩ (65,581,139)	₩ (6,137,551)	₩ (71,718,690)
Investment in associates	(41,521,139)	(4,532,197)	(46,053,336)	(11,418,313)	(1,246,355)	(12,664,668)
Reserve for research and human resource development	-	-	-	-	-	-
Property and equipment	(47,359,753)	40,117,899	(7,241,854)	(8,439,347)	9,718,679	1,279,332
Employee welfare fund	(4,956,885)	(9,593)	(4,966,478)	(1,363,143)	(2,638)	(1,365,781)
Prepaid rent expenses	(5,616,353)	975,775	(4,640,578)	(1,544,497)	268,338	(1,276,159)
Investment in subsidiaries	(661,430,158)	(96,336,397)	(757,766,555)	(181,893,293)	(26,492,510)	(208,385,803)
Right-of-use assets	-	(190,229,735)	(190,229,735)	-	(52,313,177)	(52,313,177)
Accrued expenses	71,221,439	6,780,864	78,002,303	19,585,896	1,864,737	21,450,633
Long-term accrued expense	40,064,198	(3,643,341)	36,420,857	11,017,654	(1,001,918)	10,015,736
Provision	16,366,589	(1,086,451)	15,280,138	4,500,812	(298,774)	4,202,038
Deposit	6,087,166	(979,878)	5,107,288	1,673,971	(269,467)	1,404,504
Foreign exchange gains and losses	138,582	3,420,709	3,559,291	38,110	940,695	978,805
Taxes and dues	383,244	(21,941)	361,303	105,392	(6,034)	99,358
Lease liabilities	-	194,918,943	194,918,943	-	53,602,709	53,602,709
Others	(279,262,138)	6,677,087	(272,585,051)	18,774,747	(6,530,248)	12,244,499
Subtotal	(1,144,362,077)	200,094,226	(944,267,851)	(214,543,150)	(27,903,514)	(242,446,664)
Deferred income tax charged directly to shareholders' equity:						
Valuation of FVOCI and others	306,079,487	71,198,993	377,278,480	73,521,677	28,413,554	101,935,231

Deferred tax assets	36,398,872
Deferred tax liabilities	(176,910,305)
Net deferred tax assets (liabilities)	₩ (140,511,433)

December 31, 2018

	Korean won (in thousands)					
	Cumulative temporary differences			Deferred tax assets (liabilities)		
	Beginning	Changes	End	Beginning	Changes	End
Deferred income tax arising from temporary differences:						
Net defined benefit liabilities	₩ (210,600,596)	₩ (27,876,273)	₩ (238,476,869)	₩ (57,915,164)	₩ (7,665,975)	₩ (65,581,139)
Investment in associates	(40,491,205)	(1,029,934)	(41,521,139)	(11,135,081)	(283,232)	(11,418,313)
Reserve for research and human resource development	(4,666,667)	4,666,667	-	(1,283,333)	1,283,333	-
Property and equipment	(63,079,481)	15,719,728	(47,359,753)	(11,392,897)	2,953,550	(8,439,347)
Employee welfare fund	(5,054,200)	97,315	(4,956,885)	(1,389,905)	26,762	(1,363,143)
Prepaid rent expenses	(6,706,172)	1,089,819	(5,616,353)	(1,844,197)	299,700	(1,544,497)
Investment in subsidiaries	(542,732,888)	(118,697,270)	(661,430,158)	(149,251,544)	(32,641,749)	(181,893,293)
Accrued expenses	65,116,280	6,105,159	71,221,439	17,906,977	1,678,919	19,585,896
Long-term accrued expense	29,836,044	10,228,154	40,064,198	8,204,912	2,812,742	11,017,654
Provision	20,769,917	(4,403,328)	16,366,589	5,711,727	(1,210,915)	4,500,812
Deposit	7,145,026	(1,057,860)	6,087,166	1,964,882	(290,911)	1,673,971
Foreign exchange gains and losses	11,981,544	(11,842,962)	138,582	3,294,925	(3,256,815)	38,110
Taxes and dues	383,244	-	383,244	105,392	-	105,392
Others	132,092,571	(411,354,709)	(279,262,138)	30,853,315	(12,078,568)	18,774,747
Subtotal	(606,006,583)	(538,355,494)	(1,144,362,077)	(166,169,991)	(48,373,159)	(214,543,150)
Deferred income tax charged directly to shareholders' equity:						
Valuation of FVOCI and others	145,337,517	160,741,970	306,079,487	34,079,129	39,442,548	73,521,677

Deferred tax assets	34,928,673
Deferred tax liabilities	(175,950,146)
Net deferred tax assets (liabilities)	₩ (141,021,473)

Realization of the future tax benefits related to the deferred tax assets is dependent on many factors, including the Group's ability to generate sufficient taxable income within the period during which the temporary differences reverse, the outlook of the global economic environment and the overall future industry outlook. The Group's management periodically considers these factors in reaching its conclusion.

(4) Deferred income tax assets and liabilities credited (charged) directly to equity as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
Temporary differences:	December 31, 2019	December 31, 2018
Valuation gain (loss) on FVOCI	₩ (91,552)	₩ (541,552)
Other capital adjustment	43,250,352	50,992,107
Remeasurement of loss on retirement benefits	334,119,680	255,628,932
	₩ 377,278,480	₩ 306,079,487
Deferred tax assets	₩ 101,935,231	₩ 73,521,677

33. CASH FLOWS FROM OPERATING ACTIVITIES:

(1) Adjustment items to net income for cash flows from operating activities and changes in operating assets and liabilities for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Net income	₩ 750,448,957	₩ 638,792,258
Adjustment items:		
Foreign exchange losses	14,252,078	7,313,851
Depreciation	354,980,578	207,020,124
Amortization	87,379,158	101,249,492
Provision for severance indemnities	108,014,772	98,219,767
Foreign exchange gains	(7,120,860)	(11,621,991)
Reversal of provision for project loss	(902,678)	(4,574,324)
Impairment loss on property and equipment	2,691,173	2,543,393
Impairment loss on asset classified as held for sale	20,602,874	-
Income tax expense	285,838,812	317,738,488
Others	(42,175,070)	(21,818,342)
	823,560,837	696,070,458

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Changes in operating assets and liabilities:		
Increase in trade receivables	₩ (145,073,635)	₩ (176,682,671)
Decrease (increase) in other receivables	(94,068,713)	75,442,385
Increase in prepaid expenses	(7,112,975)	(2,791,984)
Increase (decrease) in trade payables	(13,699,179)	128,524,246
Decrease in other payables	(11,799,521)	(36,618,933)
Increase in accrued expenses	35,796,217	136,833,118
Changes in net defined benefit liabilities	(170,571,693)	(148,257,009)
Decrease in advances received	(14,408,524)	(10,305,910)
Increase (decrease) in withholdings	(5,568,424)	902,690
Others	(18,250,388)	28,840,767
	(444,756,835)	(4,113,301)
Cash flows from operating activities	₩ 1,129,252,959	₩ 1,330,749,415

(2) Significant transactions not affecting cash flows for the years ended December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Write-off of accounts receivable and long-term and short-term other receivables by offset of allowance for doubtful accounts	₩ 1,482,886	₩ 4,062,966
Transfer of construction in progress	185,483,787	1,337,000
Changes in other payables in connection with the acquisition of property and equipment	(366,588)	(2,633,460)
Changes in other payables in connection with the acquisition of intangible assets	81,927	704,251
Right-of use assets transfer of lease liabilities	583,512,282	-
Lease receivables transfer of right-of use assets	27,472,573	-
Asset classified as held for sale transfer of property and equipment	82,150,874	-

(3) Adjustments of liabilities from financing activities for the years ended December 31, 2019 and 2018, are as follows:

December 31, 2019

	Korean won (in thousands)			
	Beginning balance	New lease (*1)	Cash flows	Ending balance
Short-term borrowings	₩ 774,724	₩ 22,786	₩ -	₩ 797,510
Current portion of lease liabilities	-	301,818,982	(151,868,876)	149,950,106
Lease liabilities	-	295,725,470	-	295,725,470
Corporate bond	10,000	-	-	10,000
Total	₩ 784,724	₩ 597,567,238	₩ (151,868,876)	₩ 446,483,086

(*1) Impact of introduction of K-IFRS 1116 *Leases* and interest on lease liabilities are included.

December 31, 2018

	Korean won (in thousands)			
	Beginning balance	Transfer	Cash flows	Ending balance
Short-term borrowings	₩ 820,296	₩ (45,572)	₩ -	₩ 774,724
Current portion of corporate bond	10,000	-	(10,000)	-
Corporate bond	-	-	10,000	10,000
Total	₩ 830,296	₩ (45,572)	₩ -	₩ 784,724

34. FINANCIAL RISK MANAGEMENT:

The Group is exposed to credit risk, liquidity risk and market risk. Market risk arises from currency risk, interest rate risk and fair value risk associated with investments. The Group has a risk management program in place to monitor and actively manage such risks.

The Group's finance management team is responsible for financial risk management. Also, the financial risk management officers develop, evaluate and estimate the financial risk, and hedge the risk exposures in cooperation with the business units of the Group and domestic and overseas subsidiaries.

The Group’s financial assets that are under financial risk management are composed of cash and cash equivalents, short-term financial instruments, financial assets measured at fair value, trade and other receivables and other financial assets. The Group’s financial liabilities under financial risk management are composed of trade and other payables and others.

(1) Market risk

1) Foreign exchange risk

The Group is exposed to foreign exchange risk due to revenues and expenses arising from foreign currency transactions through global business activities. These transactions are mainly conducted in USD, EUR, JPY and other foreign currencies.

To minimize foreign exchange risk arising from operating activities, the Group’s foreign exchange management policy requires all normal business transactions, such as import-export, to be in functional currency or cash inflows in foreign currencies to match up with cash outflows in foreign currencies. Foreign exchange risk for inevitably occurring foreign exchange positions is managed in accordance with the procedures and regulations prescribed in advance.

The Group’s foreign currency risk management policy also defines foreign exchange risk, measurement period, controlling responsibilities and management procedures. The Group restricts all speculative foreign exchange transactions and operates a system to manage receivables and payables denominated in foreign currency. The Group’s global foreign currency management system monitors, evaluates, manages and reports its foreign exchange risk (Net assets in foreign currencies = Assets in foreign currencies – Liability in foreign currencies).

The carrying amounts of financial assets and liabilities denominated in foreign currency held by the Group as of December 31, 2019 and 2018, are as follows:

	Korean won (in thousands)			
	Assets		Liabilities	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
USD	482,005,205	617,705,670	98,873,221	209,175,292
EUR	83,629,441	68,053,970	18,134,039	24,318,904
JPY	46,654,003	1,542,136	5,505	16,952

In addition to the major currencies, the Company has other financial assets denominated in foreign currency amounting to ₩20,016 million and ₩23,845 million as of December 31, 2019 and 2018, respectively, and other financial liabilities denominated in foreign currency amounting to ₩2,626 million and ₩6,964 million as of December 31, 2019 and 2018, respectively.

Foreign currency exposure to financial assets and liabilities of a 5% currency rate change against the Korean won as of December 31, 2019 and 2018, is presented below. The 5% represents reasonably possible changes in exchange rates by applying sensitivity when foreign exchange rate risk is internally reported to key management personnel. Sensitivity analysis includes only monetary items to be paid denominated in foreign currencies. Foreign currency translations are adjusted by assuming a 5% change in foreign exchange rates at the end of the reporting period.

	Korean won (in thousands)			
	USD effect		EUR effect	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Net income for the year	₩ 19,156,599	₩ 20,426,519	₩ 3,274,770	₩ 2,186,753
Net assets	19,156,599	20,426,519	3,274,770	2,186,753

2) Stock price risk

The Group’s investment portfolio consists of investments in listed and unlisted securities using direct and indirect investment vehicles for strategic purposes. The Group has no listed securities except for investments in subsidiaries and investments in associates as of December 31, 2019 and 2018 (see Note 12).

3) Interest rate risk

The Group is exposed to fair value risk of consolidated statements of financial position items due to changes in market price rates, and is exposed to interest rate risk, such as changes in cash flows of interest income and expense arising from investing and financing activities, including investment risk. The Group's position with regard to interest rate risk exposure is mainly driven by interest-bearing deposits and variable-rate borrowings. The Group establishes the policy to manage the uncertainty related to interest rate fluctuations and minimize interest expenses.

In order to avoid interest rate risk, the Group maintains minimum external borrowings by facilitating cash pooling systems on regional and global bases. The Group manages exposed interest rate risk via periodic monitoring and planning.

The Company does not have variable rate borrowings as of December 31, 2019 and 2018.

(2) Credit risk

Credit risk arises during the normal course of transactions and investing activities, where clients or other party fails to discharge an obligation. The Group monitors and sets the customer's and counterparty's credit limit on a periodic basis based on the counterparty's financial conditions, default history and other important factors.

Credit risk also arises from cash and cash equivalents, savings and derivative instrument transactions with financial institutions. To minimize such risk, the Group transacts only with banks that have strong international credit rating, and all new transactions with financial institutions with no prior transaction history are approved, managed and monitored by the Group's finance team.

Book value of financial assets represents the maximum exposure to credit risk. The Group's maximum exposure to credit risk as of December 31, 2019 and 2018, is as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Financial guarantee agreement (*1)	₩ 10,000,000	₩ 10,000,000

(*1) The Group's maximum exposure in relation to financial guarantee contracts is the maximum amount to be paid by the Group if warranties are claimed.

Financial assets exposed to credit risk, excluding financial guarantee contracts, are excluded from disclosure because the carrying amounts best represent maximum exposure to credit risk.

(3) Liquidity risk

It is important for the Group to maintain adequate level of liquidity considering the Group's large-scale investments. The Group manages its liquidity risk to maintain adequate liquidity by constantly managing periodic projected cash flows through estimated required cash levels and cash flow management.

Accordingly, the Group estimates and manages required working capital, including required cash and cash equivalents. Funding is deposited and procured in banks at an amount greater than a predetermined level.

Meanwhile, the Group mitigates liquidity risk by contracting with financial institutions with respect to bank overdrafts or banking facility agreement.

Also, in the event of large investments in facilities, the Group manages liquidity risk using available cash reserves or long-term borrowings.

The following table shows in detail the contractual maturities of non-derivative financial liabilities. This table was prepared on the basis of earliest maturity date based on undiscounted cash flows of financial liabilities and includes all cash flows of principal and interest. Contractual maturity is based on the earliest date the Group could be required to make payment.

	Korean won (in thousands)			
	December 31, 2019		December 31, 2018	
	Less than 1 year	1 year– 5 years	Less than 1 year	1 year– 5 years
Financial liabilities:				
Trade and other payables	₩ 618,332,279	₩ -	₩ 639,566,939	₩ -
Accrued expenses	572,166,175	43,610,247	530,638,198	51,418,608
Borrowings and corporate bond	797,510	10,000	774,724	10,000
Lease liabilities	149,950,106	295,725,470	-	-
Other financial liabilities	1,663,367	4,347,950	5,256,149	-
	1,342,909,437	343,693,667	1,176,236,010	51,428,608
Financial guarantee agreement	10,000,000	-	10,000,000	-
Total	₩1,352,909,437	₩ 343,693,667	₩1,186,236,010	₩ 51,428,608

(4) Capital risk management

The Group's capital management objective is to maintain a sound capital structure. The Group uses the debt-to-equity ratio as an indicator to manage capital. This ratio is calculated by dividing total liabilities with total equity.

There was no change in the Group's capital risk management policy in comparison with the year ended December 31, 2018.

The debt-to-equity ratio of the Group as of December 31, 2019 and 2018, is as follows:

	Korean won (in thousands)	
	December 31, 2019	December 31, 2018
Total debt	₩ 2,296,078,794	₩ 1,865,297,206
Total equity	6,725,157,089	6,148,552,184
Debt-to-equity ratio	34.10%	30.34%

35. RELATED-PARTY TRANSACTIONS:

(1) The Group's related parties as of December 31, 2019 and 2018, are as follows:

	Ownership (%)	
	December 31, 2019	December 31, 2018
Entity with significant influence over the Group:		
Samsung Electronics Co., Ltd. and its subsidiaries	-	-
Associates:		
DongA.com Co., Ltd.	18.97	18.97
Dunet, Inc.	18.01	18.01
Korea Information Certificate Authority, Inc.	6.42	6.42
SERI Technologies, Inc.	29.00	29.00
iMarket Asia Co., Ltd.	40.56	40.56
CMC Corporation	30.00	-
Other related parties (*1):		
Samsung SDI Co., Ltd. and etc.	-	-

(*1) A large-scale business group affiliation (other related parties) does not correspond to the related parties defined in paragraph 9 of K-IFRS 1024. However, a large-scale business group affiliation designated by the Fair Trade Commission is a company classified as related party and in accordance with the resolution of the Securities and Futures Commission, is classified as a related party in accordance with the substantive relationship stipulated in paragraph 10 of K-IFRS 1024.

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

December 31, 2019:

	Korean won (in thousands)	
	Revenues	Purchase (*1)
Entities with significant influence over the Group:		
Samsung Electronics Co., Ltd.	₩ 2,598,446,547	₩ 49,211,764
Samsung Display Co., Ltd.	199,030,037	71,125
Samsung Electronics America, Inc.	620,101,575	21,939,651
Samsung Electronics Ltd. (UK)	83,872,592	2,782,722
Samsung Electronics Europe Logistics	258,583,695	1,706,390
Samsung Electronics Slovakia s.r.o	36,893,014	136,419
SAMSUNG ELECTRONICS BALTICS SIA	4,031,620	87,004
Samsung Electronics Poland Manufacturing	79,275,557	35,820
Samsung India Electronics Private Ltd.	182,450,558	232,247
Thai Samsung Electronics Co., Ltd.	244,219,993	127,184
Samsung Electronics Vietnam	181,318,458	1,809,321
Samsung Electronics Huizhou Co., Ltd.	75,602,306	5,403
Samsung(China) Semiconductor Co. Ltd	195,001,260	414,896
Others(*2)	2,857,736,678	69,580,654
Associates:		
iMarket Asia Co., Ltd.	213,956	70,978
DongA.com Co., Ltd.	130,339	-
Korea Information Certificate Authority, Inc.	160,900	297,080
SERI Technologies, Inc.	3,051	842,699
Total	₩ 7,617,072,136	₩ 149,351,357

(*1) The Group purchased machinery and other equipment of ₩8,413 million from Samsung Electronics Co., Ltd. for the year ended December 31, 2019.
(*2) Others consist of the subsidiaries of Samsung Electronics Co., Ltd.

December 31, 2018:

	Korean won (in thousands)	
	Revenues	Purchase (*1)
Entities with significant influence over the Group:		
Samsung Electronics Co., Ltd.	₩ 2,479,627,255	₩ 32,044,971
Samsung Display Co., Ltd.	171,013,708	17,514
Samsung Electronics America, Inc.	547,691,885	7,134,152
Samsung Electronics Ltd. (UK)	69,057,413	249,373
Samsung Electronics Europe Logistics	234,423,200	794,254
Samsung Electronics Slovakia s.r.o	55,070,290	163,322
SAMSUNG ELECTRONICS BALTICS SIA	3,993,863	79,462
Samsung Electronics Poland Manufacturing	72,359,533	27,573
Samsung India Electronics Private Ltd.	152,894,967	13,308
Thai Samsung Electronics Co., Ltd.	200,980,108	891,574
Samsung Electronics Vietnam	175,790,217	31,233
Samsung Electronics Huizhou Co., Ltd.	156,493,870	28,604
Samsung(China) Semiconductor Co. Ltd	176,439,217	-
Others(*2)	2,638,463,453	45,500,532
Associates:		
iMarket Asia Co., Ltd.	224,049	79,574
DongA.com Co., Ltd.	101,348	-
Korea Information Certificate Authority, Inc.	129,848	300,966
SERI Technologies, Inc.	3,250	959,785
Total	₩ 7,134,757,474	₩ 88,316,197

(*1) The Group purchased machinery and other equipment of ₩5,730 million from Samsung Electronics Co., Ltd. for the year ended December 31, 2018.
(*2) Others consist of the subsidiaries of Samsung Electronics Co., Ltd.

Revenues and purchase transactions with other related parties for the years ended December 31, 2019 and 2018, are as follows:

December 31, 2019:

	Korean won (in thousands)			
		Revenues		Purchase
Other related parties:				
Samsung SDI Co., Ltd.	₩	153,891,857	₩	123,213
Samsung Fire & Marine Insurance Co., Ltd.		169,911,143		16,900,282
Samsung Life Insurance Co., Ltd.		172,030,104		30,690,194
Samsung C&T Corporation		98,643,624		37,779,128
Others		809,353,047		118,451,700
Total	₩	1,403,829,775	₩	203,944,517

December 31, 2018:

	Korean won (in thousands)			
		Revenues		Purchase
Other related parties:				
Samsung SDI Co., Ltd.	₩	184,871,206	₩	424,697
Samsung Fire & Marine Insurance Co., Ltd.		197,874,849		11,941,838
Samsung Life Insurance Co., Ltd.		188,704,750		21,861,420
Samsung C&T Corporation		108,660,694		27,841,759
Others		742,390,916		78,221,324
Total	₩	1,422,502,415	₩	140,291,038

(3) Receivables from and payables to related parties as of December 31, 2019 and 2018, are as follows:

December 31, 2019:

	Korean won (in thousands)			
		Receivables		Payables(*2)
Entities with significant influence over the Group:				
Samsung Electronics Co., Ltd.	₩	743,898,773	₩	50,581,188
Samsung Display Co., Ltd.		51,102,219		623,738
Samsung Electronics America, Inc.		43,995,127		3,175,829
Samsung Electronics Ltd. (UK)		14,522,190		3,376,730
Samsung Electronics Europe Logistics		35,293,578		182,638
Samsung Electronics Slovakia s.r.o		3,504,106		-
SAMSUNG ELECTRONICS BALTICS SIA		575,986		86,650
Samsung Electronics Poland Manufacturing		8,841,103		656,567
Samsung India Electronics Private Ltd.		23,568,665		658,964
Thai Samsung Electronics Co., Ltd.		17,605,653		2,345,738
Samsung Electronics Vietnam		11,488,604		1,464,700
Samsung Electronics Huizhou Co., Ltd.		1,274,161		-
Samsung(China) Semiconductor Co. Ltd.		42,542,213		520,036
Others (*1)		334,396,457		52,757,069
Associates:				
iMarket Asia Co., Ltd.		16,094		3,503
DongA.com Co., Ltd.		7,128		40,113
SERI Technologies, Inc.		-		2,723
Total	₩	1,332,632,057	₩	116,476,186

(*1) Others consist of the subsidiaries of Samsung Electronics Co., Ltd.
(*2) Lease liabilities of ₩42,362 million is included for the year ended December 31, 2019.

December 31, 2018:

	Korean won (in thousands)			
	Receivables		Payables	
Entities with significant influence over the Group:				
Samsung Electronics Co., Ltd.	₩	617,746,989	₩	28,027,575
Samsung Display Co., Ltd.		21,551,417		547,140
Samsung Electronics America, Inc.		75,724,416		1,367,707
Samsung Electronics Ltd. (UK)		9,303,017		2,375,504
Samsung Electronics Europe Logistics		31,456,940		830,076
Samsung Electronics Slovakia s.r.o		5,418,631		1,303
SAMSUNG ELECTRONICS BALTICS SIA		487,356		28,626
Samsung Electronics Poland Manufacturing		8,719,811		12,663
Samsung India Electronics Private Ltd.		34,319,297		878,319
Thai Samsung Electronics Co., Ltd.		12,855,202		496,159
Samsung Electronics Vietnam		10,826,620		73,492
Samsung Electronics Huizhou Co., Ltd.		9,376,389		7,444
Samsung(China) Semiconductor Co. Ltd.		80,609,749		5,496,903
Others (*1)		278,858,848		8,747,240
Associates:				
iMarket Asia Co., Ltd.		17,440		19,427
DongA.com Co., Ltd.		7,128		13,692
SERI Technologies, Inc.		-		1,237
Total	₩	1,197,279,250	₩	48,924,507

(*1) Others consist of the subsidiaries of Samsung Electronics Co., Ltd.

Receivables from and payables to other related parties as of December 31, 2019 and 2018, are as follows:

December 31, 2019:

	Korean won (in thousands)			
	Receivables(*1)		Payables(*2)	
Other related parties:				
Samsung SDI Co., Ltd.	₩	33,438,371	₩	1,548,575
Samsung Fire & Marine Insurance Co., Ltd.		21,471,589		873,835
Samsung Life Insurance Co., Ltd.		9,748,894		846,983
Samsung C&T Corporation		86,395,263		15,168,376
Others		157,087,788		27,485,669
Total	₩	308,141,905	₩	45,923,438

(*1) Lease receivables of ₩25,503 million is included for the year ended December 31, 2019.
(*2) Lease liabilities of ₩5,215 million is included for the year ended December 31, 2019.

December 31, 2018

	Korean won (in thousands)			
	Receivables		Payables	
Other related parties:				
Samsung SDI Co., Ltd.	₩	32,031,049	₩	2,514,068
Samsung Fire & Marine Insurance Co., Ltd.		28,043,130		291,162
Samsung Life Insurance Co., Ltd.		16,317,070		18,818
Samsung C&T Corporation		32,282,910		14,530,056
Others		145,082,234		24,176,558
Total	₩	253,756,393	₩	41,530,662

(4) Key management compensation

Key management compensation for the Group's registered executives recognized as expenses for the years ended December 31, 2019 and 2018, is as follows:

	Korean won (in thousands)			
	2019		2018	
Short-term benefits	₩	3,605,132	₩	3,391,282
Other long-term benefits		931,777		3,567,614
Severance benefits		556,234		487,022
Total	₩	5,093,143	₩	7,445,918

Key management refers to the registered directors who have significant control and responsibilities over the Group's planning, operating and control activities.

(5) The Group recognized allowance for doubtful accounts of ₩54 thousand and ₩375 thousand with respect to receivables from related parties as of December 31, 2019 and 2018, respectively, and the Group reversed ₩321 thousand and ₩343 thousand of allowance for doubtful accounts recognized for the years ended December 31, 2019 and 2018, respectively.

36. EARNINGS PER SHARE:

(1) Basic earnings per share for the years ended December 31, 2019 and 2018, are as follows:

	Korean won			
	December 31, 2019		December 31, 2018	
Basic earnings per share	₩	9,521	₩	8,137

(2) Basic earnings per share

Net income attributable to the owners of the Group and the weighted-average number of shares outstanding used in calculating basic earnings per share are as follows:

	Korean won (in thousands)			
	December 31, 2019		December 31, 2018	
Net income attributable to the owners of the Group	₩	736,457,959	₩	629,399,571

	Number of shares	
	December 31, 2019	December 31, 2018
Weighted-average number of common shares outstanding (shares)	77,350,186 shares	77,350,186 shares

(3) Diluted earnings per share

Diluted earnings per share are the same as basic earnings per share, as diluted securities are not held on December 31, 2019 and 2018.

37. APPROVAL OF CONSOLIDATED FINANCIAL STATEMENTS:

The consolidated financial statements of the Group as of and for the year ended December 31, 2019, to be submitted at the board of directors' meeting on January 30, 2020, will be finally authorized at the ordinary shareholders' meeting on March 18, 2020

38. EMISSION RIGHTS AND LIABILITIES:

(1) The quantity of the emission allowances allocated free of charge for the three-year plan period from 2018 to 2020 is as follows:

	Quantity of emission allowances allocated free of charge	
2018	KAU	48,165
2019		45,999
2020		45,999
Total	KAU	140,163

(2) The changes in the quantity of allowances and the carrying value for the years ended December 31, 2019 and 2018, are as follows:

	KAU				Korean won (in thousands)			
	Quantity				Book value			
	2019		2018		2019		2018	
Beginning	KAU	25,142	KAU	24,758	₩	359,915	₩	359,915
Allocated		45,999		48,165		-		-
Disposal		-		(8,381)		-		-
Applied		-		(39,400)		-		-
Ending	KAU	71,141	KAU	25,142	₩	359,915	₩	359,915

No emission allowances are provided as collateral for the year ended December 31, 2019. The estimated quantity of emission produced for the year ended December 31, 2019, is 38,913 KAU.