



SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

**CONSOLIDATED FINANCIAL STATEMENTS
AS OF AND FOR THE YEARS ENDED
DECEMBER 31, 2018 AND 2017**

ATTACHMENT: INDEPENDENT AUDITORS' REPORT

SAMSUNG SDS CO., LTD.

INDEPENDENT AUDITORS' REPORT

English Translation of Independent Auditors' Report Originally Issued in Korean on March 12, 2019.

**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, 2018 and 2017, 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, 2018 and 2017, 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 Auditors Responsibilities for the Audit of the 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 Matters

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

- 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 (below 'SI sales') revenue is recognized over period. (see Note 2.(6)). 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 ₩556,881 million SI revenue (10% of IT service revenue, see Note 23) in which the project modification occurred during the current period.

SI sales amounts in which the project modification occurred is 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 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 below.

- 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 of 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 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 the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Group's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

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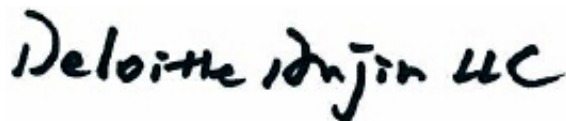
- Conclude on the appropriateness of the management's use of the going-concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If 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.



March 12, 2019

Notice to Readers

This report is effective as of March 12, 2019, 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, 2018 AND 2017**

“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, 2018 AND 2017

		Korean won	
	Notes	December 31, 2018	December 31, 2017
ASSETS:			
CURRENT ASSETS:			
Cash and cash equivalents	5 and 7	₩ 1,161,683,996,643	₩ 931,461,393,278
Short-term financial instruments	6 and 7	2,510,284,469,888	1,993,797,925,148
Trade receivables	7 and 9	1,291,751,923,940	1,209,629,541,269
Other receivables	7, 9 and 23	705,745,458,041	752,347,002,331
Prepayments		44,176,075,255	50,929,792,621
Prepaid expenses		67,265,138,198	60,612,034,305
Inventories	10	18,774,414,708	24,760,255,484
Other current assets	7 and 9	82,094,810,348	93,960,630,430
Total current assets		<u>5,881,776,287,021</u>	<u>5,117,498,574,866</u>
NON-CURRENT ASSETS:			
Available-for-sale financial assets	7, 8, 11 and 30	-	12,651,779,719
Fair value through profit or loss (FVPL)	7, 8, 11 and 30	3,643,123,202	-
Fair value through other comprehensive income (FVOCI)	7, 8, 11 and 30	22,934,357,054	-
Investments in associates	13	43,993,605,770	40,540,078,417
Property and equipment	4 and 14	1,068,725,507,567	1,028,557,824,366
Intangible assets	4 and 15	844,969,106,310	934,859,502,433
Deposits	7	69,754,328,207	66,995,507,157
Long-term prepaid expenses		239,673,339	357,450,549
Deferred tax assets	28	34,928,672,689	32,572,487,036
Net defined benefit assets	18	-	18,475,464,964
Other non-current assets	6, 7 and 9	42,884,729,555	25,252,210,300
Total non-current assets		<u>2,132,073,103,693</u>	<u>2,160,262,304,941</u>
Total assets		<u>₩ 8,013,849,390,714</u>	<u>₩ 7,277,760,879,807</u>
LIABILITIES:			
CURRENT LIABILITIES:			
Trade payables	7 and 30	₩ 553,320,727,257	₩ 443,247,815,452
Other payables	7 and 30	86,246,212,056	67,797,699,978
Short-term borrowings	7, 16, 19 and 30	774,724,000	820,296,000
Current portion of corporate bond	7,16 and 30	-	10,000,000
Advances received	23	136,026,841,259	156,455,270,861
Withholdings		13,638,047,892	13,695,212,967
Accrued expenses	7 and 30	530,638,197,561	423,284,546,673
Income tax payable		144,206,747,497	97,148,199,186
Current portion of provisions	17	18,630,738,697	15,899,051,770
Other current liabilities	7 and 30	91,314,141,348	106,504,445,697
Total current liabilities		<u>1,574,796,377,567</u>	<u>1,324,862,538,584</u>
NON-CURRENT LIABILITIES:			
Net defined benefit liabilities	18	40,822,200,125	10,926,995,813
Deferred tax liabilities	28	175,950,146,216	164,663,348,882
Corporate bond	7, 16 and 30	10,000,000	-
Long-term accrued expenses	7 and 30	51,418,608,045	38,608,592,197
Provisions	17	17,195,182,991	14,847,659,688
Other non-current liabilities	7	5,104,691,400	4,422,308,000
Total non-current liabilities		<u>290,500,828,777</u>	<u>233,468,904,580</u>
Total liabilities		<u>1,865,297,206,344</u>	<u>1,558,331,443,164</u>

(Continued)

SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

CONSOLIDATED STATEMENTS OF FINANCIAL POSITION (CONTINUED)

AS OF DECEMBER 31, 2018 AND 2017

		Korean won	
	Notes	December 31, 2018	December 31, 2017
SHAREHOLDERS' EQUITY:			
Common stock	20	₩ 38,688,900,000	₩ 38,688,900,000
Share premium		1,297,466,852,618	1,297,466,852,618
Retained earnings	21	4,821,746,821,634	4,347,047,622,867
Other component of equity	22	(175,447,564,604)	(124,924,831,837)
Non-controlling interests		166,097,174,722	161,150,892,995
Total shareholders' equity		6,148,552,184,370	5,719,429,436,643
Total liabilities and shareholders' equity		₩ 8,013,849,390,714	₩ 7,277,760,879,807

(Concluded)

See notes.

SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

		Korean won	
	Notes	2018	2017
REVENUES	4, 23 and 31	₩10,034,218,901,478	₩ 9,299,206,129,920
COST OF REVENUES	24 and 31	<u>8,369,829,634,622</u>	<u>7,804,602,140,616</u>
GROSS PROFIT		1,664,389,266,856	1,494,603,989,304
SELLING AND ADMINISTRATIVE EXPENSES	24 and 25	<u>787,033,453,660</u>	<u>763,044,840,695</u>
OPERATING PROFIT	4	877,355,813,196	731,559,148,609
NON-OPERATING ITEMS:			
Other non-operating income	26 and 31	29,243,729,251	41,215,803,934
Other non-operating expenses	26 and 31	28,111,462,915	37,251,002,915
Finance income	27	135,575,773,191	90,197,224,346
Finance expenses	27	60,559,477,429	76,086,747,335
Gain (loss) on valuation/disposal of investments in associates, net	13	<u>3,026,371,038</u>	<u>2,461,278,648</u>
		<u>79,174,933,136</u>	<u>20,536,556,678</u>
PROFIT BEFORE INCOME TAX EXPENSE		956,530,746,332	752,095,705,287
INCOME TAX EXPENSE	28	<u>317,738,487,919</u>	<u>210,323,428,014</u>
NET INCOME		<u>638,792,258,413</u>	<u>541,772,277,273</u>
OTHER COMPREHENSIVE INCOME (LOSS):			
Item not subsequently reclassified to net income:			
Remeasurement of net defined benefit liabilities	18	(67,590,731,350)	24,783,402,057
Valuation gain (loss) on fair value through other comprehensive income	11	<u>7,534,531,931</u>	<u>-</u>
		<u>(60,056,199,419)</u>	<u>24,783,402,057</u>
Items subsequently reclassified to net income:			
Valuation gain (loss) on AFS financial assets	11	-	2,177,512,468
Capital change in equity method	13	590,356,315	(2,723,317,587)
Cumulative effect of foreign currency translation		<u>6,692,905,152</u>	<u>(88,031,612,812)</u>
		<u>7,283,261,467</u>	<u>(88,577,417,931)</u>
		<u>(52,772,937,952)</u>	<u>(63,794,015,874)</u>
TOTAL COMPREHENSIVE INCOME		<u>₩ 586,019,320,461</u>	<u>₩ 477,978,261,399</u>

(Continued)

SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (CONTINUED)

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

		Korean won	
	Notes	2018	2017
NET INCOME ATTRIBUTABLE TO:			
Owners of the Group		₩ 629,399,570,767	₩ 530,347,610,989
Non-controlling interests		9,392,687,646	11,424,666,284
COMPREHENSIVE INCOME ATTRIBUTABLE TO:			
Owners of the Group		579,565,395,281	466,762,850,365
Non-controlling interests		6,453,925,180	11,215,411,034
EARNINGS PER SHARE:			
Basic earnings per share	32	<u>₩ 8,137</u>	<u>₩ 6,856</u>
Diluted earnings per share	32	<u>₩ 8,137</u>	<u>₩ 6,856</u>

(Concluded)

See notes.

SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

**CONSOLIDATED STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY
FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017**

	Korean won					
	Common stock	Other component of equity			Non-controlling interests	Total
		Share premium	Retained earnings	Subtotal		
Balance as of January 1, 2017	₩ 38,688,900,000	₩ 1,297,466,852,618	₩ 3,874,712,651,378	₩ 5,140,694,501,824	₩ 150,429,592,757	₩ 5,291,124,094,581
Comprehensive income	-	-	₩ 530,347,610,989	₩ 466,762,850,365	₩ 11,215,411,034	₩ 477,978,261,399
Net income	-	-	₩ 530,347,610,989	-	₩ 11,424,666,284	₩ 541,772,277,273
Valuation gain (loss) on AFS financial assets	-	-	-	₩ 2,153,465,580	₩ 24,046,888	₩ 2,177,512,468
Capital change in equity method	-	-	-	₩ (2,723,317,587)	-	₩ (2,723,317,587)
Remeasurement of the net defined benefit liabilities	-	-	-	-	-	-
Cumulative effect of foreign currency translation	-	-	-	₩ 24,951,126,358	₩ (167,724,301)	₩ 24,783,402,057
Transactions with shareholders	-	-	-	₩ (87,966,034,975)	₩ (65,577,837)	₩ (88,031,612,812)
Dividends	-	-	₩ (58,012,639,500)	₩ 8,833,830,959	₩ (494,110,796)	₩ (49,672,919,337)
Changes in ownership interests in subsidiaries	-	-	₩ (58,012,639,500)	-	₩ (1,522,447,250)	₩ (59,535,086,750)
Balance as of December 31, 2017	₩ 38,688,900,000	₩ 1,297,466,852,618	₩ 4,347,047,622,867	₩ 8,833,830,959	₩ 1,028,336,454	₩ 9,862,167,413
Balance as of January 1, 2018	₩ 38,688,900,000	₩ 1,297,466,852,618	₩ 4,347,047,622,867	₩ 5,558,278,543,648	₩ 161,150,892,995	₩ 5,719,429,436,643
Comprehensive income	-	-	₩ 4,347,047,622,867	₩ (124,924,831,837)	₩ 161,150,892,995	₩ 5,719,429,436,643
Net income	-	-	₩ 629,399,570,767	₩ (49,834,175,126)	₩ 6,453,925,180	₩ 586,019,320,821
Valuation gain (loss) on FVOCI	-	-	₩ 629,399,570,767	-	₩ 9,392,687,646	₩ 638,792,258,413
Capital change in equity method	-	-	-	₩ 7,437,212,891	₩ 97,319,040	₩ 7,534,531,931
Remeasurement of the net defined benefit liabilities	-	-	-	₩ 590,356,315	-	₩ 590,356,315
Cumulative effect of foreign currency translation	-	-	-	₩ (64,255,224,105)	₩ (3,335,507,245)	₩ (67,590,731,350)
Transactions with shareholders	-	-	-	₩ 6,393,479,773	₩ 299,425,739	₩ 6,692,905,512
Dividends	-	-	₩ (154,700,372,000)	₩ (688,557,641)	₩ (1,507,643,453)	₩ (156,896,573,094)
Changes in ownership interests in subsidiaries	-	-	₩ (154,700,372,000)	-	₩ (2,294,963,500)	₩ (156,995,335,500)
Balance as of December 31, 2018	₩ 38,688,900,000	₩ 1,297,466,852,618	₩ 4,821,746,821,634	₩ (688,557,641)	₩ 787,320,047	₩ 98,762,406
				₩ (175,447,564,604)	₩ 166,097,174,722	₩ 6,148,552,184,370

See notes.

SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

		Korean won	
	Note	2018	2017
CASH FLOWS FROM OPERATING ACTIVITIES:			
Cash generated from operating activities	29	₩ 1,330,749,415,211	₩ 968,922,950,760
Interest received		61,863,057,751	30,259,865,840
Interest paid		(38,569,693)	(614,144,156)
Dividends received		15,900,000	18,175,000
Income taxes paid		<u>(196,058,249,099)</u>	<u>(163,739,656,158)</u>
		<u>1,196,531,554,170</u>	<u>834,847,191,286</u>
CASH FLOWS FROM INVESTING ACTIVITIES:			
Net increase in short-term financial instruments		(516,486,544,740)	(761,199,121,276)
Decrease (increase) in other current asset		(7,004,809,295)	621,650,641
Decrease (increase) in long-term financial instruments		(18,097,027,818)	4,500,000
Disposal of property and equipment		1,509,595,861	1,561,431,367
Disposal of intangible assets		5,888,893	106,430,563
Disposal of AFS financial assets		-	2,882,572
Decrease in deposits		8,174,848,980	519,211,000
Acquisition of property and equipment		(251,434,878,395)	(192,068,771,788)
Acquisition of intangible assets		(26,121,127,847)	(30,684,845,524)
Increase in deposits		(8,187,779,534)	(419,987,625)
Acquisition of FVOCI		(2,139,000,000)	(2,313,599,745)
Decrease (increase) in other non-current assets		<u>1,224,556,867</u>	<u>13,447,596,518</u>
		<u>(818,556,277,028)</u>	<u>(970,422,623,297)</u>
CASH FLOWS FROM FINANCING ACTIVITIES:			
Proceed (repayments) from short-term borrowings		-	(1,788,187,040)
Repayment of current portion of long-term borrowings		-	(4,079,731,662)
Issues of corporate bond		10,000,000	-
Repayment of corporate bond		(10,000,000)	-
Dividends		(156,995,335,500)	(59,535,086,750)
Decrease (increase) in other non-current liabilities		-	(3,016,809,889)
Payment of non-controlling interests		<u>787,320,047</u>	<u>774,385,884</u>
		<u>(156,208,015,453)</u>	<u>(67,645,429,457)</u>
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS		<u>221,767,261,689</u>	<u>(203,220,861,468)</u>
CASH AND CASH EQUIVALENTS, BEGINNING OF YEAR		931,461,393,278	1,190,227,458,620
EFFECT OF EXCHANGE RATE CHANGE ON CASH AND CASH EQUIVALENTS		<u>8,455,341,676</u>	<u>(55,545,203,874)</u>
CASH AND CASH EQUIVALENTS, END OF YEAR		<u>₩ 1,161,683,996,643</u>	<u>₩ 931,461,393,278</u>

See notes.

SAMSUNG SDS CO., LTD. AND ITS SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

AS OF DECEMBER 31, 2018 AND 2017,
AND FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

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 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, 2018, 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	22.58%
Samsung C&T Corporation	13,215,822	17.08%
Lee, Jae-yong	7,116,555	9.20%
Lee, Bu-jin	3,018,859	3.90%
Lee, Suh-hyeon	3,018,859	3.90%
Others	33,535,595	43.34%
	<u>77,377,800</u>	<u>100.00%</u>

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES:

The Group has prepared the consolidated financial statements in accordance with the Korean International Financial Reporting Standards (“K-IFRSs”). The principal accounting policies are set out below. Except for the effect of the amendments to K-IFRSs 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, 2018, are consistent with the accounting policies used to prepare the consolidated financial statements as of and for the year ended December 31, 2017.

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 1017 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) Amendments to K-IFRSs and new interpretations that are mandatorily effective for the current year

In the current year, the Group has applied a number of amendments to K-IFRSs and new interpretations issued that are mandatorily effective accounting periods beginning on or after January 1, 2018.

K-IFRS 1109, *Financial Instruments (Enactment)*

The Group has applied K-IFRS 1109 Financial Instruments and the related consequential amendments to other IFRS standards that are effective for an annual period that begins on or after January 1, 2018. K-IFRS 1109 introduced new requirements for:

- 1) The classification and measurement of financial assets and financial liabilities,
- 2) Impairment of financial assets, and
- 3) General hedge accounting.

Additionally, the Group adopted consequential amendments to K-IFRS 1107 Financial Instruments: Disclosures that were applied to the disclosures for 2018.

IFRS 9 provides transition requirements that do not restate prior periods when the IFRS is first applied; therefore, the Group elected not to restate comparative information for the prior period when applying this enactment for the first time.

Details of these new requirements as well as their impact on the Group's consolidated financial statements are described below.

(a) Classification and measurement of financial assets

All recognized financial assets that are within the scope of K-IFRS 1109 are required to be measured subsequently at amortized cost or fair value on the basis of the entity's business model for managing the financial assets and the contractual cash flow characteristics of the financial assets.

- debt instruments that are held within a business model whose objective is to collect the contractual cash flows, and that have contractual cash flows that are solely payments of principal and interest on the principal amount outstanding, are measured subsequently at amortized cost;
- debt instruments that are held within a business model whose objective is both to collect the contractual cash flows and to sell the debt instruments, and that have contractual cash flows that are solely payments of principal and interest on the principal amount outstanding, are measured subsequently at fair value through other comprehensive income (FVOCI);
- all other debt investments and equity investments are measured subsequently at fair value through profit or loss (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 that is neither held for trading nor contingent consideration recognized by an acquirer in a business combination in other comprehensive income; 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.

In the current year, the Group has not designated any debt investments that meet the amortized cost or FVOCI criteria as measured at FVPL.

When a debt investment measured at FVOCI is derecognized, the cumulative gain or loss previously recognized in other comprehensive income is reclassified from equity to profit or loss as a reclassification adjustment. When an equity investment designated as measured at FVOCI is derecognized, the cumulative gain or loss previously recognized in other comprehensive income is subsequently transferred to retained earnings.

Debt instruments that are measured subsequently at amortized cost or at FVOCI are subject to impairment. See (b) below.

The directors of the Group reviewed and assessed the Group's existing financial assets as at January 1, 2018, based on the facts and circumstances that existed at that date and concluded that the initial application of K-IFRS 1109 has had the following impact on the Group's financial assets as regards their classification and measurement:

- The Group's investments in redeemable notes were classified as available-for-sale ("AFS") financial assets under K-IFRS 1039 *Financial Instruments: Recognition and Measurement*. The notes have been reclassified as financial assets at amortized cost because they are held within a business model whose objective is to collect the contractual cash flows and they have contractual cash flows that are solely payments of principal and interest on the principal amount outstanding;
- The Group's investment in corporate bonds that were classified as AFS financial assets under K-IFRS 1039 have been classified as financial assets at FVOCI because they are held within a business model whose objective is both to collect contractual cash flows and to sell the bonds, and they have contractual cash flows that are solely payments of principal and interest on principal outstanding. The change in the fair value on these redeemable notes continues to accumulate in the investment revaluation reserve until they are derecognized or reclassified;
- The Group's investments in equity instruments (neither held for trading nor a contingent consideration arising from a business combination) that were previously classified as AFS financial assets and were measured at fair value at each reporting date under K-IFRS 1109 have been designated as at FVOCI. The change in fair value on these equity instruments continues to be accumulated in the investment revaluation reserve;
- There is no change in the measurement of the Group's investments in equity instruments that are held for trading; those instruments were and continue to be measured at FVPL;
- Financial assets classified as held-to-maturity and loans and receivables under K-IFRS 1039 that were measured at amortized cost continue to be measured at amortized cost under K-IFRS 1109 as they are held within a business model to collect contractual cash flows and these cash flows consist solely of payments of principal and interest on the principal amount outstanding.

Note (e) below tabulates the change in classification of the Group's financial assets upon application of K-IFRS 1109. Due to options for classifying equity investment, the valuation gain on AFS financial assets of ₩2,412,620 thousand which recognized as in other comprehensive income and subsequently reclassified to net income has been classified to the designated valuation gain of ₩2,412,620 thousand on FVOCI that are not subsequently reclassified to net income.

None of the other reclassifications of financial assets have had any impact on the Group's financial position, profit or loss, other comprehensive income or total comprehensive income in the current year.

(b) Impairment of financial assets

In relation to the impairment of financial assets, K-IFRS 1109 requires an expected credit loss ("ECL") model as opposed to an incurred credit loss model under K-IFRS 1039. The ECL model requires the Group to account for ECL and changes in those ECL at each reporting date to reflect changes in credit risk since initial recognition of the financial assets. In other words, it is no longer necessary for a credit event to have occurred before credit losses are recognized.

Specifically, K-IFRS 1109 requires the Group to recognize a loss allowance for ECL on:

- (1) Debt investments measured subsequently at amortized cost or at FVOCI,
- (2) Lease receivables,
- (3) Trade receivables and contract assets, and
- (4) Financial guarantee contracts to which the impairment requirements of K-IFRS 1109 apply.

In particular, K-IFRS 1109 requires the Group to measure the loss allowance for a financial instrument at an amount equal to the lifetime ECL if the credit risk on that financial instrument has increased significantly since initial recognition, or if the financial instrument is a purchased or originated credit-impaired financial asset. However, if the credit risk on a financial instrument has not increased significantly since initial recognition (except for a purchased or originated credit-impaired financial asset), the Group is required to measure the loss allowance for that financial instrument at an amount equal to 12-month ECL. K-IFRS 1109 also requires a simplified approach for measuring the loss allowance at an amount equal to lifetime ECL for trade receivables, contract assets and lease receivables in certain circumstances.

The Group has assessed whether there has been a significant increase in credit risk since initial recognition of financial instruments that remain recognized on the date of initial application of K-IFRS 1109 (i.e., January 1, 2018), the directors have assessed the credit risk of the respective financial instruments on the date of their initial recognition. There were no additional loss allowance determined in accordance with K-IFRS 1109.

		<u>Korean won (in thousands)</u>
<u>Items existing as at January 1, 2018, that are subject to the impairment provisions of K-IFRS 1109</u>	<u>Credit risk attributes at January 1, 2018</u>	<u>Cumulative additional loss allowance recognized on January 1, 2018</u>
Trade and other payables	The Group applies the simplified approach and recognizes lifetime ECL for these assets	-
Contract assets	Debtors' significant credit risk is assessed to be low at each reporting date	-
Loans, deposits provided	All long-term and short-term financial instruments are assessed to have low credit risk at each reporting date	-
Long-term and short-term financial instruments	as they are held with reputable international banking institutions	-
Financial guarantee agreement	Debtors' significant credit risk is assessed to have low at each reporting date	-

The consequential amendments to K-IFRS 1107 have also resulted in more extensive disclosures about the Group's exposure to credit risk in the consolidated financial statements.

(c) Classification and measurement of financial liabilities

A significant change introduced by K-IFRS 1109 in the classification and measurement of financial liabilities relates to the accounting for changes in the fair value of a financial liability designated as at FVPL attributable to changes in the credit risk of the issuer.

Specifically, K-IFRS 1109 requires that the changes in the fair value of the financial liability that is attributable to changes in the credit risk of that liability be presented in other comprehensive income, unless the recognition of the effects of changes in the liability's credit risk in other comprehensive income would create or enlarge an accounting mismatch in profit or loss. Changes in fair value attributable to a financial liability's credit risk are not subsequently reclassified to profit or loss, but are instead transferred to retained earnings when the financial liability is derecognized.

The application of K-IFRS 1109 has had no impact on the classification and measurement of the Group's financial liabilities.

Please refer to Note (e) below for further details regarding the change in classification upon the application of K-IFRS 1109.

(d) General hedge accounting

The new general hedge accounting requirements retain the three types of hedge accounting. However, greater flexibility has been introduced to the types of transactions eligible for hedge accounting, specifically broadening the types of instruments that qualify for hedging instruments and the types of risk components of non-financial items that are eligible for hedge accounting. In addition, the effectiveness test has been replaced with the principle of an 'economic relationship.' Retrospective assessment of hedge effectiveness is also no longer required. Enhanced disclosure requirements about the Group's risk management activities have also been introduced.

The application of the K-IFRS 1109 hedge accounting requirements has had no impact on the results and financial position of the Group for the current year.

(e) The table below shows information relating to financial assets and financial liabilities that have been reclassified as a result of transition to K-IFRS 1109 and K-IFRS 1039:

			Korean won (in thousands)		
	Category		Carrying amount		
	K-IFRS 1039	K-IFRS 1109	K-IFRS 1039	Remeasurements	K-IFRS 1109
Financial assets measured at fair value (see Notes 7,8 and 11)	AFS financial assets	FVPL	₩ 2,320,327	₩ -	₩ 2,320,327
Financial assets measured at fair value (see Notes 7,8 and 11) (*1)	AFS financial assets	FVOCI	10,331,453	-	10,331,453
Short-term financial instruments (see note 7)	Loans and receivables	Financial assets measured at amortized cost	1,993,797,925	-	1,993,797,925
Trade receivables, other receivables and others(see Notes 7 and 9) (*2)	Loans and receivables	Financial assets measured at amortized cost	1,399,634,175	-	1,399,634,175
Other financial assets (see note 7) (*3)	Loans and receivables	Financial assets measured at amortized cost	109,548,960	-	109,548,960
Trade and other payables(see note 7)	Financial liabilities measured at amortized cost	Financial liabilities measured at amortized cost	511,045,515	-	511,045,515
	Financial liabilities measured at amortized cost	Financial liabilities measured at amortized cost	461,893,139	-	461,893,139
Accrued expense(see note 7)	Financial liabilities measured at amortized cost	Financial liabilities measured at amortized cost	830,296	-	830,296
Borrowings and corporate bonds (see Notes 7 and 16)	Financial liabilities measured at amortized cost	Financial liabilities measured at amortized cost	5,828,950	-	5,828,950
Other financial liabilities (see Note 7) (*4)	Financial liabilities measured at amortized cost	Financial liabilities measured at amortized cost			

(*1) The Group makes an irrevocable election to present in other comprehensive income 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.

(*2) Others, such as short-term loans receivable, long-term trade receivables and long-term loans receivable are included.

(*3) Other financial assets, such as accrued income, deposits provided for guarantees, long-term financial instruments and deposits provided are included.

(*4) Other financial liabilities, such as accrued dividends, short-term deposits received and long-term deposits received are included.

Details of the impact on the equity of these new requirements are described below.

	Korean won (in thousands)			
	Equity attributable to owners of the parent		Non-controlling interests	Total
	Retained earnings	Other component of equity		
Balance as at January 1, 2018 K-IFRS 1039	₩ -	₩ 2,412,620	₩ 24,047	₩ 2,436,667
The impact of the reclassification of financial instruments				
Valuation gain (loss) on AFS financial assets	-	(2,412,620)	(24,047)	(2,436,667)
Valuation gain (loss) on FVOCI	-	2,412,620	24,047	2,436,667
Balance as at January 1, 2018, K-IFRS 1109	₩ -	₩ 2,412,620	₩ 24,047	₩ 2,436,667

There were no additional loss allowances determined in accordance with K-IFRS 1109.

K-IFRS 1115 – Revenue from Contracts with Customers (Enactment)

In the current year, the Group has applied K-IFRS 1115 *Revenue from Contracts with Customers* which is effective for an annual period that begins on or after January 1, 2018. K-IFRS 1115 introduced a five-step approach to revenue recognition. Far more prescriptive guidance has been added in K-IFRS 1115 to deal with specific scenarios. The content of the requirements of IFRS 15 and the accounting policies applied by the Group are listed in '(6) Revenue Recognition' below; details of the new requirements as well as their impact on the Group's consolidated financial statements are described below.

The Group has applied K-IFRS 1115 in accordance with the fully retrospective transitional approach using the expedient in K-IFRS 1115 allowing both non-disclosure of the amount of the transaction price allocated to the remaining performance obligations, and an explanation of when it expects to recognize that amount as revenue for all reporting periods presented before the date of initial application, i.e., January 1, 2018.

K-IFRS 1102—Share-based Payment (Amendment)

The amendments include: 1) when measuring the fair value of share-based payment, the effects of vesting and non-vesting conditions on the measurement of cash-settled share-based payment should be consistent with the measurement of equity-settled share-based payment, 2) share-based payment transaction in which the Group settles the share-based payment arrangement net by withholding a specified portion of the equity instruments per statutory tax withholding requirements would be classified as equity settled in its entirety, if otherwise would be classified as equity-settled without the net settlement feature, and 3) when a cash-settled share-based payment changes to an equity-settled share-based payment because of modifications of the terms and conditions, the original liability recognized is derecognized and the equity-settled share-based payment is recognized at the modification date fair value. Any difference between the carrying amount of the liability at the modification date and the amount recognized in equity at the same date would be recognized in profit and loss immediately. The application of K-IFRS 1102 has not had a significant impact on the consolidated financial statements of the Group.

K-IFRS 1040—Transfers of Investment Property (Amendment)

The amendments clarify that a transfer to, or from, investment property necessitates an assessment of whether a property meets, or has ceased to meet, the definition of investment property, supported by observable evidence that a change in use has occurred. The amendments further clarify that situations other than the ones listed in K-IFRS 1040 may evidence a change in use, and that a change in use is possible for properties under construction (i.e., a change in use is not limited to completed properties). The application of K-IFRS 1040 has not had a significant impact on the consolidated financial statements of the Group.

Annual Improvements to K-IFRS Standards 2014-2016 Cycle

The annual improvements include amendments to K-IFRS 1101 First-time Adoption and K-IFRS 1028 *Investment in Associates and Joint Ventures*. The amendments to K-IFRS 1028 clarify that the option for a venture capital organization and other similar entities to measure investments in associates and joint ventures at FVPL is available separately for each associate or joint venture, and that election should be made at initial recognition of the associate or joint venture. In respect of the option for an entity that is not an investment entity (IE) to retain the fair value measurement applied by its associates and joint ventures that are IEs when applying the equity method, the amendments make a similar clarification that this choice is available for each IE associate or IE joint venture.

The Group does not anticipate that the application of the amendments in the future will have any impact on the Group's consolidated financial statements as the Group is neither a first-time adopter of IFRS nor a venture capital organization. Furthermore, the Group does not have any associate or joint venture that is an IE.

K-IFRS 2122—Foreign Currency Transactions and Advance Consideration (Enactment)

The interpretation addresses how to determine the 'date of transaction' for the purpose of determining the exchange rate to use on initial recognition of an asset, expense or income, when consideration for that item has been paid or received in advance in a foreign currency which resulted in the recognition of a non-monetary asset or non-monetary liability (e.g., a non-refundable deposit or deferred revenue).

The interpretation specifies that the date of transaction is the date on which the entity initially recognizes the non-monetary asset or non-monetary liability arising from the payment or receipt of advance consideration. If there are multiple payments or receipts in advance, the interpretation requires an entity to determine the date of transaction for each payment or receipt of advance consideration.

The Group does not anticipate that the application of the enactment in the future will have an impact on the Group's consolidated financial statements because the Group already accounts for transactions involving the payment or receipt of advance consideration in a foreign currency in a way that is consistent with the enactment.

The application of these amendments and new interpretations has not had a significant impact on the financial statements of the Group.

— New and revised K-IFRSs in issue, but not yet effective

K-IFRS 1116—Leases (Enactment)

1. General impact of application of K-IFRS 1116 *Leases*

K-IFRS 1116 provides a comprehensive model for the identification of lease arrangements and their treatments in the financial statements for both lessors and lessees. K-IFRS 1116 will supersede the current lease guidance including K-IFRS 1017 *Leases* and the related interpretations when it becomes effective for accounting periods beginning on or after January 1, 2019. The date of initial application of K-IFRS 1116 for the Group will be January 1, 2019.

The lessees have an option to choose between the full retrospective application for each reporting date and modified retrospective application at the initial application date.

In preparation for the adoption of K-IFRS 1116, the Group conducted consultations with related departments from June 2018 to September 2018, and as of December 31, 2018, the Task Force ("TF") team composed of external accounting firms and accounting staff. The TF team analyzed the impact for the Group, if necessary, with the help of sales and IT staff. Through these processes, the Group improved its internal management processes and changed some accounting systems and implemented training.

The Group plans to apply modified retrospective approach as of January 1, 2019, in accordance with K-IFRS 1116. Therefore, the cumulative effect of applying K-IFRS 1116 will be adjusted in the retained earnings (or, where appropriate, other components of equity) at the date of initial application, and the comparative financial statements will not be restated.

The lessee and lessor must account for each lease element of the lease, separate from the non-lease element ("non-lease element") in a lease contract. The lessee is required to recognize lease assets and liabilities that represents the right to use the underlying assets and the obligation to pay the lease payments. However, in the case of short-term lease and small-value-based lease, the exemption provisions of the standard may be selected. In addition, the lessee is not required to separate the lease component from the non-lease component in accordance with the simplified approach, and can account for each lease component and related non-lease component as one lease component.

In contrast to lessee accounting, K-IFRS 1116 substantially carries forward the lessor accounting requirements in K-IFRS 1017.

2. Impact of the new definition of a lease

The Group will make 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 will continue to apply to those leases entered or modified before January 1, 2019.

The change in definition of a lease mainly relates to the concept of control. K-IFRS 1116 distinguishes between leases and service contracts on the basis of whether the use of an identified asset is controlled by the customer. Control is considered to exist if the customer has:

- The right to obtain substantially all of the economic benefits from the use of an identified asset
- The right to direct the use of that asset.

The new definition in K-IFRS 1116 is under consideration on the impact of the scope of contracts that meet the definition of a lease for the Group.

3. Impact on Lessee Accounting

Operating leases

K-IFRS 1116 will change how the Group accounts for leases previously classified as operating leases under K-IFRS 1017, which were off balance sheet. On initial application of K-IFRS 1116, for all leases (except as noted below), the Group will:

- a) Recognize right-of-use assets and lease liabilities in the consolidated statement of financial position, initially measured at the present value of the future lease payments;
- b) Recognize depreciation of right-of-use assets and interest on lease liabilities in the consolidated statement of profit or loss;
- c) Separate the total amount of cash paid into a principal portion (presented within financing activities) and interest (presented within operating activities) in the consolidated cash flow statement.

Under K-IFRS 1116, right-of-use assets will be tested for impairment in accordance with K-IFRS 1036 *Impairment of Assets*. This will replace the previous requirement to recognize a provision for onerous lease contracts.

For short-term leases (lease term of 12 months or less) and leases of low-value assets (such as personal computers and office furniture), the Group will opt to recognize a lease expense on a straight-line basis as permitted by K-IFRS 1116.

Finance leases

The main differences between K-IFRS 1116 and K-IFRS 1017 with respect to assets formerly held under a finance lease is the measurement of the residual value guarantees provided by the lessee to the lessor. K-IFRS 1116 requires that the Group recognizes as part of its lease liability only the amount expected to be payable under a residual value guarantee, rather than the maximum amount guaranteed as required by K-IFRS 1017. On initial application, the Group will present equipment previously included in property, plant and equipment within the line item for right-of-use assets and the lease liability, previously presented within borrowing, will be presented in a separate line for lease liabilities.

The application of these enactments is under consideration on the impact of the disclosure of the Group's consolidated financial statements.

4. Impact on Lessor Accounting

Under K-IFRS 1116, a lessor continues to classify leases as either finance leases or operating leases and account for those two types of leases differently. However, K-IFRS 1116 has changed and expanded the disclosures required, in particular regarding 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 sublease as two separate contracts. The intermediate lessor is required to classify the sublease 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 will reclassify certain of its sublease agreements as finance leases. As required by K-IFRS 1109, an allowance for ECL will be recognized on the finance lease receivables. The leased assets will be derecognized and finance lease asset receivables recognized. This change in accounting will change the timing of recognition of the related revenue (recognized in finance income).

K-IFRS 1109—Prepayment Features with Negative Compensation (Amendment)

The amendments to K-IFRS 1109 clarify that for the purpose of assessing whether a prepayment feature meets the Solely payment 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, prepayment features with negative compensation do not automatically fail SPPI. The amendment applies to annual periods beginning on or after January 1, 2019, with earlier application permitted.

K-IFRS 1028—Long-term Interests in Associates and Joint Ventures (Amendment)

The amendment clarifies that K-IFRS 1109, including its impairment requirements, applies to long-term interests. Furthermore, in applying K-IFRS 1109 to long-term interests, an entity 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). The amendments apply retrospectively to annual reporting periods beginning on or after January 1, 2019. Earlier application is permitted.

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 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.

All the amendments are effective for annual periods beginning on or after January 1, 2019, and generally require prospective application. Earlier application is permitted.

K-IFRS 1019—Employee Benefits Plan Amendment, Curtailment or Settlement (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 is now clear that the change in the effect of the asset ceiling that may result from the plan amendment (or curtailment or settlement) is determined in a second step and is recognized in the normal manner in other comprehensive income.

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. An entity will 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 to 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 paragraph 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)).

The amendments are applied prospectively. They apply only to plan amendments, curtailments or settlements that occur on or after the beginning of the annual period in which the amendments to K-IFRS 1019 are first applied. The amendments to K-IFRS 1019 must be applied to annual periods beginning on or after January 1, 2019, but they can be applied earlier if an entity elects to do so.

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

This amendment relates to prevent the revision of meaning 'contract' referred in K-IFRS 1115 paragraph 129.1 to 'individual contract' in relation to 'additional disclosure of contracts based on contract costs incurred to date', so that even if application of K-IFRS 1115 is adopted, the range of disclosure has not been reduced. In addition, K-IFRS 1115 does not distinguish the types of contracts that the service contracts that did not qualify for the application of K-IFRS 1011 in paragraph 45.1 can be qualified in K-IFRS 1115 paragraph 129.1 and it is to clarify that the range of the contracts subject to make disclosure in accordance with paragraph 129.1 can be expanded compared to the previous standard. This amendment is effective for annual periods beginning on or after January 1, 2019, and earlier application is permitted.

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

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 interpretation is effective for annual periods beginning on or after January 1, 2019. Entities can apply the interpretation with either full retrospective application or modified retrospective application without restatement of comparatives retrospectively or prospectively.

The application of these amendments is under consideration on the impact of the disclosure of the Group's consolidated financial statements.

(2) Basis of consolidation

The consolidated financial statements incorporate the financial statements of the Company and 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 control 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 the Group's voting rights in an investee are sufficient to give it 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 other comprehensive income 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 Group.

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 other comprehensive income and accumulated in equity, the amounts previously recognized in other comprehensive income 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 PHI 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 PHIs 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 other comprehensive income 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 other comprehensive income of the associate or joint venture. When the Group's share of losses of an associate or a joint venture exceeds the Group's 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), the Group 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 other comprehensive income 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 other comprehensive income 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 the Group continues to use the equity method, the Group reclassifies to profit or loss the proportion of the gain or loss that had previously been recognized in other comprehensive income 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 a group 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.

(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.

(6) 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

Application of K-IFRS 1115 (1) supply of hardware, (2) supply of software, (3) provision of software and professional services (supply of custom software), (4) provision of hardware, software and professional services (system integration), (5) provision of professional services, (6) provision of software and update services (if the update is essential to the functioning of the software) and (7) provision of maintenance services.

The Group recognizes revenues by cost-to-cost method for basis of percentage of total costs incurred when supplying customized software and system.

According to K-IFRS 1115, the Group's custom-built software and custom-built systems 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.

Revenue recognized before being billed to the customer is included in contract assets in accordance with K-IFRS 1115.

There are cases that when the Group provides hardware, software and maintenance services with the Group's products or implements other parties to provide service for the customers.

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.

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.

(7) Lease

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.

1) 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.

2) 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 statement 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.

(8) 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 are the functional currency of the entity and the presentation currency for the consolidated financial statements.

In preparing the financial statements of the individual 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 other comprehensive income and reclassified from equity to profit or loss on disposal or partial disposal of the net investment.

For the purpose of presenting the consolidated financial statements, the assets and liabilities of the Group'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 other comprehensive income and accumulated in equity (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. Any exchange differences that have previously been attributed to non-controlling interests are derecognized, but they are not 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 other comprehensive income.

(9) 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 statement of financial position by deducting the grant from the carrying amount of the asset. 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.

(10) 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 statement of financial position with a charge or credit to the statement of comprehensive income in the period in which they occur. Remeasurements recognized in the statement 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 statement 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:

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.

(11) 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 statement 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.

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 other comprehensive income or directly in equity, in which case the current and deferred taxes are also recognized in other comprehensive income or directly in equity, respectively. 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.

(12) 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 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:

	<u>Useful lives</u> (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.

(13) 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.

Expenditure arising from development (or from the development phase of an internal project) is recognized as an intangible asset only if the development project is designed to produce new or substantially improved products and the Group can demonstrate the technical and economic feasibility and measure reliably the resources 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.

(14) 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 the 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 a 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.

(15) Inventories

Inventories are stated at the lower of cost or net realizable value. Cost of inventories, except for those in transit, are measured using the average method and consists 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 is 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.

(16) 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.

(17) Financial instruments

Financial assets and financial liabilities are recognized in the Group's statement 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.

(18) 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 other comprehensive income 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 27).

1-2) Debt instruments classified as at FVOCI

The corporate bonds held by the Group are 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 other comprehensive income and accumulated under the heading of investments revaluation reserve. When these corporate bonds are derecognized, the cumulative gains or losses previously recognized in other comprehensive income 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 other comprehensive income and accumulated in the investments' revaluation reserve. The cumulative gain or loss is not 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 'finance income' 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 operating income and expenses' line item (see Note 26). 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 'other operating income and expenses' line item (see Note 26);
- 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 'other operating income and expenses' line item (see Note 26). 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 27); 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 ECL 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;
- 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 contracts, 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 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 is consistent with the cash flows used in measuring the lease receivable in accordance with K-IFRS 1017 *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 payments 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 other comprehensive income and accumulated in the investment revaluation reserve, and does not reduce the carrying amount of the financial asset in the statement 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, the Group continues to recognize the financial asset and also recognizes 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, but is transferred to retained earnings.

(19) 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 26) 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 other comprehensive income, unless the recognition of the effects of changes in the liability's credit risk in other comprehensive income 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 other comprehensive income 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 instruments.

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 'other operating income and expenses' line item in profit or loss (see Note 26) 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 other comprehensive income 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, the Group's 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 the 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.

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

The Group classifies the emission rights as intangible assets. Emission right allowances that the government allocated free of charge are measured at ₩0, and emission right allowances purchased are measured at cost, which the Group paid to purchase the allowances. If emission right allowances that the government allocated free of charge are sufficient to settle the emission right 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 current and 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 to which goodwill has been allocated.

(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 on the Estimation of Earnings Accumulation Tax ("EAT")

Under the EAT regime, the Group may incur increased tax burden depending on its level of investment, payroll increase or cash dividends for the preceding three years from 2018. There is uncertainty in the estimation of the tax impact to the Group, which is reviewed by the management per the current level of investment, payroll increase or cash dividends.

4. SEGMENT REPORTING:

(1) Basis for segmentation

The Group is composed of an IT service division and Logistics Business Process Outsourcing (“BPO”) division, which are strategic business units of the Group. 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.
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, 2018 and 2017, is as below. The 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 evaluates segment assets based on property and equipment and intangible assets. Segment liabilities are not reported to the Group CEO and, therefore, are not disclosed.

1) Segment information

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
Segments 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

December 31, 2017:

	Korean won (in thousands)				
	Logistics BPO	IT service	Total	Adjustments	Adjusted amounts
Revenue	₩ 4,323,676,660	₩ 6,052,418,562	₩ 10,376,095,222	₩ (1,076,889,092)	₩ 9,299,206,130
Internal revenue	(154,096,983)	(922,792,109)	(1,076,889,092)	1,076,889,092	-
External revenue	4,169,579,677	5,129,626,453	9,299,206,130	-	9,299,206,130
Depreciation	4,958,406	210,523,102	215,481,508	(1,754,389)	213,727,119
Amortization	6,248,239	109,682,443	115,930,682	3,020,273	118,950,955
Operating profit	72,505,160	655,518,553	728,023,713	3,535,436	731,559,149
Segments assets	27,270,371	1,936,146,956	1,963,417,327	-	1,963,417,327
Acquisition of non-current assets	12,555,091	239,082,543	251,637,634	(21,920,591)	229,717,043

2) Information on geographical areas

The Group's revenue (based on location) by region is as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Revenue:		
Domestic	₩ 4,810,714,593	₩ 4,389,918,546
America	1,770,056,485	1,628,550,148
Europe	847,509,732	817,354,821
Asia and Africa (*1)	1,529,295,495	1,552,741,271
China	1,076,642,596	910,641,344
Total	₩ 10,034,218,901	₩ 9,299,206,130

(*1) Korea and China are excluded.

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Non-current asset (*1):		
Domestic	₩ 1,825,163,478	₩ 1,894,777,714
America	40,940,134	41,690,089
Europe	19,028,192	10,065,777
Asia and Africa (*2)	19,356,530	8,661,761
China	9,206,280	8,221,986
Total	₩ 1,913,694,614	₩ 1,963,417,327

(*1) Financial instruments, investments in associates, deferred tax assets and long-term prepaid expenses are not included.

(*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 ₩7,134,299 million and ₩6,836,142 million for the years ended December 31, 2018 and 2017, respectively.

5. CASH AND CASH EQUIVALENTS:

Cash and cash equivalents as of December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Cash	₩ 3,546	₩ 4,737
Demand deposits	1,161,680,451	931,456,656
Total	₩ 1,161,683,997	₩ 931,461,393

6. FINANCIAL INSTRUMENTS RESTRICTED AND PLEDGED AS COLLATERAL:

Details of restricted financial instruments and those pledged as collateral as of December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Short-term financial instruments:		
Deposit related to national project	₩ 76,388	₩ 45,248
Long-term financial instruments:		
Deposits for checking account	17,000	17,000
Deposits for subcontractors (*1)	36,400,000	18,300,000
Others (*2)	15,000	15,000
Total	₩ 36,508,388	₩ 18,377,248

(*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, 2018 and 2017, are as follows:

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	<u>₩ 5,307,591,508</u>	<u>₩ 22,934,357</u>	<u>₩ 3,643,123</u>	<u>₩ 5,334,168,988</u>	<u>₩ 5,334,168,988</u>

(*1) Other assets, such as short-term loans receivable, long-term trade receivable and long-term loans receivable 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	<u>₩ 1,227,664,618</u>	<u>₩ 1,227,664,618</u>	

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

December 31, 2017:

Korean won (in thousands)				
	Loans and receivables	AFS financial assets	Total	Fair value
Financial assets:				
Cash and cash equivalents	₩ 931,461,393	₩ -	₩ 931,461,393	₩ 931,461,393
Short-term financial instruments	1,993,797,925	-	1,993,797,925	1,993,797,925
Long-term AFS financial assets (*1)	-	12,651,780	12,651,780	12,651,780
Trade receivables, other receivables and other assets (*2)	1,399,634,175	-	1,399,634,175	1,399,634,175
Others (*3)	109,548,960	-	109,548,960	109,548,960
Total	<u>₩ 4,434,442,453</u>	<u>₩ 12,651,780</u>	<u>₩ 4,447,094,233</u>	<u>₩ 4,447,094,233</u>

(*1) Equity instruments that do not have a quoted price in an active market and fair values cannot be measured reliably are measured at cost and excluded from the fair value disclosures.

(*2) Other assets, such as short-term loans receivable, long-term trade receivable and long-term loans receivable are included.

(*3) 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	₩	511,045,515	₩ 511,045,515
Accrued expense		461,893,139	461,893,139
Borrowings and corporate bonds		830,296	830,296
Others (*1)		5,828,950	5,828,950
Total	₩	979,597,900	₩ 979,597,900

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

(2) Gain or loss on financial instruments by category

December 31, 2018:

Korean won (in thousands)	
December 31, 2018	
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 (reclassification, OCI)	10,463,904
Dividend income	15,900
Valuation gain (loss) on FVPL	1,322,631
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.

December 31, 2017:

Korean won (in thousands)	
December 31, 2017	
Loans and receivables:	
Interest income (*1)	₩ 42,723,967
Reversal of bad debt expense (bad debt expense)	(4,541,903)
AFS financial assets:	
Valuation gain (loss) on AFS financial assets (reclassification, OCI)	2,896,088
Dividend income	18,175
Gain (loss) on disposal	(20,339)
Financial liabilities measured at amortized cost:	
Interest expense	(1,900,957)
Net gains (losses) on foreign currency transaction	(3,894,511)
Net foreign exchange gains (losses)	(22,818,023)

(*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, 2018.

(1) Fair value hierarchy

The Group classifies the financial instruments measured at fair value on the consolidated statement 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, 2018 and 2017, is as follows:

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

December 31, 2017:

		Korean won (in thousands)			
		Level 1	Level 2	Level 3	Total
AFS financial assets	₩	-	₩ 5,839,959	₩ 1,462,800	₩ 7,302,759

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, 2018.

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, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Beginning balance (*1)	₩ 6,811,821	₩ 971,400
Acquisition	2,139,165	-
Change	(2,897,936)	491,400
Ending balance	₩ 6,053,050	₩ 1,462,800

(*1) The amount of ₩5,349 million is included, which is the effect that AFS financial assets measured by the cost method as of December 31, 2017 are reclassified as FVOCI.

(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, 2018, are as follows:

Korean won (in thousands)					
	Fair value	Level	Valuation method	Inputs	Range of inputs (weighted average)
FVOCI					
CVnet Co., Ltd.	₩ 2,194,800	3	Discounted cash flow	Sales growth rate Pretax discount rate	2.4%–3.0% (2.7%) 14.0%

(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 are as follows:

	Korean won (in thousands)	
	Favorable changes	Unfavorable changes
FVOCI (*1)	₩ 147,000	₩ (127,200)

(*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, 2018 and 2017, are as follows:

	Korean won (in thousands)					
	December 31, 2018			December 31, 2017		
	Trade receivables	Other receivables (*1)	Others	Trade receivables	Other receivables	Others
Receivables, gross	₩ 1,305,368,976	₩ 211,167,342	₩ 2,361,388	₩ 1,214,391,408	₩ 754,318,073	₩ 5,578,620
Allowances for bad debts	(13,616,568)	(1,910,999)	(139,020)	(4,596,504)	(1,971,071)	(2,335,817)
Receivables, net	<u>₩ 1,291,752,408</u>	<u>₩ 209,256,343</u>	<u>₩ 2,222,368</u>	<u>₩ 1,209,794,904</u>	<u>₩ 752,347,002</u>	<u>₩ 3,242,803</u>

(*1) The service receivables in contract asset, amounting to ₩496,489,115 thousand, is excluded (see Note 23).

(2) Changes in allowance for doubtful accounts of trade and other receivables for the years ended December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)					
	December 31, 2018			December 31, 2017		
	Trade receivables	Other receivables	Others	Trade receivables	Other receivables	Others
Beginning balance	₩ 4,596,504	₩ 1,971,071	₩ 2,335,817	₩ 4,807,501	₩ 1,974,827	₩ 3,297,837
(Reversal of) bad debt expense	11,613,922	16,966	(69,996)	3,833,684	(5,055)	106,370
Receivables written off	(1,849,049)	(87,116)	(2,126,801)	(3,356,736)	-	(1,068,390)
Collection of receivables written off	4,743	3,551	-	1,826	2,886	-
Others	(749,552)	6,527	-	(689,771)	(1,587)	-
Ending balance	<u>₩ 13,616,568</u>	<u>₩ 1,910,999</u>	<u>₩ 139,020</u>	<u>₩ 4,596,504</u>	<u>₩ 1,971,071</u>	<u>₩ 2,335,817</u>

The recognition of allowances for doubtful accounts has been included in selling and administrative expenses and other income in the consolidated statements of comprehensive income (see Notes 25 and 26).

(3) The aging analysis of trade receivables, other receivables and others overdue, but not individually impaired as of December 31, 2018 and 2017, is as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Up to 1 month	₩ 248,620,879	₩ 130,363,271
1 month to 6 months	41,173,955	68,133,897
7 months to 12 months	5,496,030	26,058,574
Over 12 months	8,948,098	5,970,249
Total	<u>₩ 304,238,962</u>	<u>₩ 230,525,991</u>

(4) Details of the Group's individually impaired receivables as of December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Individually impaired receivables	₩ 15,573,587	₩ 8,380,348

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 ₩93 million and ₩523 million as of December 31, 2018 and 2017, respectively, using historical experience rates based on aging analysis of receivables.

(5) The maximum exposure to credit risk as of December 31, 2018, is the carrying value of each class of receivables.

10. INVENTORIES:

(1) Details of the Group's inventories as of December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Raw materials	₩ 1,440,066	₩ 7,488,650
Merchandise	15,070,250	15,225,336
Goods in transit	762,687	187,677
Supplies	1,488,973	1,855,044
Consigned goods	12,439	3,548
Total	<u>₩ 18,774,415</u>	<u>₩ 24,760,255</u>

(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, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Inventories recognized as expenses (cost of sales)	₩ 576,593,064	₩ 552,502,943
Inventory write-downs	2,837,045	713,107
Reversals of inventory write-downs	(1,234,550)	(928,790)

11. FINANCIAL ASSETS MEASURED AT FAIR VALUE AND LONG-TERM AFS FINANCIAL ASSETS:

(1) Changes in long-term AFS financial assets (excluding investments in associates) for the years ended December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)		
	December 31, 2018		December 31, 2017
	Fair value through other comprehensive income	Fair value through profit or loss	Total
Beginning balance	₩ 10,331,453	₩ 2,320,327	₩ 12,651,780
Increase	2,139,000	165	2,139,165
Disposal	-	-	-
Valuation profit (loss)	10,463,904	1,322,631	11,786,535
Ending balance	<u>₩ 22,934,357</u>	<u>₩ 3,643,123</u>	<u>₩ 26,577,480</u>

(2) Details of FVPL as of December 31, 2018 is as follows:

	Korean won (in thousands)	
	Book value	
Capital investment of partnership	₩	3,642,223
Unlisted securities		900
Total	<u>₩</u>	<u>3,643,123</u>

(3) Details of FVOCI as of December 31, 2018 is as follows:

	<u>Korean won (in thousands)</u>	
	<u>Book value</u>	
Unlisted securities(*1)	₩	22,934,357

(*1) The Group makes an irrevocable election to present in other comprehensive income 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 (excluding investments in associates) as of December 31, 2018 and 2017.

2) Unlisted securities (excluding investments in associates)

Details of unlisted securities (excluding investments in associates) as of December 31, 2018 and 2017, are as follows:

		<u>Korean won (in thousands)</u>			
		<u>December 31, 2018</u>		<u>December 31, 2017</u>	
	Number of shares owned	Percentage of ownership (%)	Book value		Book value
CVnet Co., Ltd. (*1)	600,000	9.38	₩ 2,194,800	₩	1,462,800
Others	-	-	₩ 20,739,557		8,884,206
Total			<u>₩ 22,934,357</u>	<u>₩</u>	<u>10,347,006</u>

(*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 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) Details of long-term AFS financial assets as of December 31, 2017, is as follows:

	<u>Korean won (in thousands)</u>	
	<u>Book value</u>	
Unlisted securities	₩	10,347,006
Capital investment of partnership		2,304,774
Total	<u>₩</u>	<u>12,651,780</u>

(5) Changes in valuation gain (loss) in the above FVPL and long-term AFS financial assets in accordance with fair value assessment for the years ended December 31, 2018 and 2017, are as follows:

		<u>Korean won (in thousands)</u>	
		<u>December 31, 2018</u>	<u>December 31, 2017</u>
Beginning balance	₩	3,180,282	₩ 308,240
Measurement of fair value		10,366,585	2,872,042
Included in profit or loss		-	-
Ending balance		<u>13,546,867</u>	<u>3,180,282</u>
Income tax effect		<u>(3,697,034)</u>	<u>(767,662)</u>
Total	<u>₩</u>	<u>9,849,833</u>	<u>₩ 2,412,620</u>

12. SUBSIDIARIES:

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

Region	Name of subsidiaries	Type of business	Number of stocks owned by			Ownership (%)	Country	Shares held by subsidiaries (%)
			Controlling Company	Subsidiary	Total			
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	-
	Samsung SDS Global SCL America, Inc.	Logistics	5,500,000	-	5,500,000	100.00	America	-
	Samsung SDS Latin Americas 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
America	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	-	-	-	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	-
Asia	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 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 GSCL Romania S.R.L.	Logistics	9,999	1	10,000	100.00	Romania	0.01
	Samsung SDS China Co., Ltd.	System integration service	-	-	-	100.00	China	-
Asia	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 GSCL Vietnam Co., Ltd.	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		Ownership (%)	Country	Shares held by subsidiaries (%)
			Controlling company	Subsidiary			
Asia	Samsung SDS Global SCL Philippines Co., Ltd. Inc.	Logistics	20,999,995	-	99.99	Philippines	-
	Samsung SDS Global SCL Thailand Co., Ltd.	Logistics	879,988	-	99.99	Thailand	-
	SDS - Acutech Co., Ltd. (*1)	Logistics	109,999	-	49.99	Thailand	-
	Samsung SDS Global SCL Malaysia SDN BHD	Logistics	2,099,998	-	99.99	Malaysia	-
	PT. Samsung SDS Global SCL Indonesia (*2)	Logistics	245	-	49.00	Indonesia	-
	Samsung SDS Global SCL Hong Kong Co., Ltd.	Logistics	11,691,380	-	100.00	Hong Kong	-
	Samsung Data Systems India Private Limited	Logistics	2,999,999	-	99.99	India	-
	Samsung SDS India Private Limited	System integration service	2,999,999	-	99.99	India	-
	Samsung SDS Global SCL Beijing Co., Ltd.	Logistics	-	-	100.00	China	100.00
	Miracon Inc. Asia Pacific Ltd.	System integration service	-	5,864,162	83.62	China	100.00
Africa	Miracon Inc. China Ltd.	System integration service	-	-	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	-	100.00	China	100.00
	SDS Kerry (Shanghai) Supply Chain Solutions Limited (*1)	Logistics	-	-	50.00	Australia	-
Middle east	VASCO Supply Chain Solutions Private Limited	Logistics	-	-	50.99	India	-
	SDS-MP Logistics Joint Stock Company	Logistics	816,000	-	51.00	Vietnam	-
	Samsung SDS Global SCL Egypt	Logistics	9,999	-	99.99	Egypt	-
	Samsung SDS Global SCL South Africa (PTY) Ltd.	Logistics	100	-	100.00	South Africa	-
Middle east	Samsung SDS Global SCL Nakliyat ve Lojistik Anonim Sirketi	Logistics	1,000	-	100.00	Turkey	-
	Samsung SDS Global SUPPLY CHAIN LOGISTICS MIDDLE EAST DWC-LLC	Logistics	2,930,000	-	100.00	Dubai	-

- (*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 December 31, 2017, is as follows:

Name of subsidiaries	Korean won (in thousands)				
	Total assets	Total liabilities	Total equity	Revenue	Net profit (loss)
S-Core Co., Ltd.	₩ 27,643,501	₩ 9,155,159	₩ 18,488,342	₩ 56,595,290	₩ 6,690,124
Open Hands Co., Ltd.	2,312,220	575,056	1,737,164	7,365,570	212,022
Miracon 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
SVIC #31 Investment Partnership	20,551,773	55,825	20,495,948	-	(205,938)
SVIC #38 Investment Partnership	838,831	129,327	709,504	-	(290,496)
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 Latin Americas Soluciones Em Tecnologia Ltda	43,383,527	11,191,336	32,192,191	62,470,873	13,500,101
Samsung SDS Mexico, S.A. de C.V.	52,192,978	42,972,768	9,220,210	265,836,414	(5,499,221)
Language Testing International, Inc.	13,733,625	2,089,650	11,643,975	19,564,672	1,352,775
Samsung SDS Global SCL Panama S.A.	4,495,177	2,973,478	1,521,699	14,359,461	499,301
Samsung SDS Global SCL Chile Limitada	3,119,677	1,536,723	1,582,954	15,210,640	(2,993)
Samsung SDS Global SCL Colombia S.A.S.	3,154,908	3,562,383	(407,475)	19,083,245	(275,972)
Samsung SDS Global SCL Peru S.A.C	5,998,304	5,022,209	976,095	26,563,384	154,091
Samsung SDS GSCL Canada., Ltd.	6,511,652	5,716,235	795,417	48,639,483	18,415
Samsung SDS Global SCL Latin America Logística 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
Neo Express Transportation (NEXT) Inc.	705,848	267,525	438,323	3,688,437	(538,084)

Name of subsidiaries	Korean won (in thousands)				Net profit (loss)
	Total assets	Total liabilities	Total equity	Revenue	
INTE-SDS Logistics S.A. de C. V.	376,451	14,070	362,381	15,529	(119,669)
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 Rus Limited Liability Company	13,739,524	6,576,035	7,163,489	80,429,144	2,513,902
Samsung SDS Global SCL Hungary Kft.	22,575,550	13,893,258	8,682,292	63,443,625	1,088,566
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 Global SCL UK Limited	7,786,819	7,533,581	253,238	39,405,697	(979,635)
Samsung GSCL Sweden AB	3,187,093	2,849,734	337,359	12,217,330	(227,728)
Samsung SDS Global SCL France SAS	1,949,401	338,539	1,610,862	-	(311,352)
Samsung SDS Global SCL Baltics, SIA	551,257	501,772	49,485	2,236,422	(149,523)
Samsung SDS Global SCL Italy S.R.L. A Socio Unico	12,572,378	11,015,745	1,556,633	37,198,532	13,270
Samsung SDS Global Supply Chain Logistics Spain S.L.U.	662,897	169,132	493,765	-	(216,506)
Samsung GSCL Portugal, Sociedade Unipessoal LDA	175,118	115,327	59,791	-	(146,434)
Samsung SDS Global SCL Greece Societe Anonyme	553,296	503,881	49,415	2,287,372	(161,603)
Samsung SDS Global SCL Germany GmbH	10,941,783	11,580,364	(638,581)	45,663,343	228,437
Samsung SDS Global SCL Austria GmbH	94,645	197,380	(102,735)	220,070	(172,058)
Samsung SDS Global SCL Czech S.R.O.	54,826	116,422	(61,596)	-	(122,918)
Samsung SDS Global SCL Switzerland GMBH	282,859	117,187	165,672	-	(138,487)
Samsung SDS GSCL Romania S.R.L.	719,275	723,705	(4,430)	2,070,429	(154,571)
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 Global SCL Asia Pacific Pte. Ltd.	5,710,946	3,462,305	2,248,641	15,613,794	73,025
Samsung SDS Vietnam Co., Ltd.	37,074,961	29,615,658	7,459,303	74,375,855	3,262,612
Samsung SDS GSCL Vietnam Co., Ltd.	365,918,143	94,744,416	271,173,727	623,564,729	41,274,047
ALS SDS Joint Stock Company	3,735,814	2,270,917	1,464,897	29,027,428	807,565
Samsung SDS Global SCL Philippines Co., Ltd. Inc.	17,878,474	20,983,747	(3,105,273)	44,700,894	(5,445,250)
Samsung SDS Global SCL Thailand Co., Ltd.	60,816,653	24,516,291	36,300,362	197,651,991	3,597,388
SDS - Acutech Co., Ltd.	1,610,441	627,879	982,562	5,520,434	224,133
Samsung SDS Global SCL Malaysia SDN. BHD	15,810,994	7,914,970	7,896,024	71,964,344	1,644,424
PT. Samsung SDS Global SCL Indonesia	11,266,880	9,446,941	1,819,939	55,913,354	(8,425,573)
Samsung SDS Global SCL Hong Kong Co., Ltd.	17,522,552	6,966,185	10,556,367	59,974,791	1,747,399
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
Miracom, Inc. Asia Pacific Ltd.	836,218	56,454	779,764	-	(6,933)
Miracom, Inc. China Ltd.	597,510	3,480,296	(2,882,786)	9,948	(1,138,919)
Samsung SDS Global Development Center Xi'an	9,543,270	1,105,219	8,438,051	20,211,510	862,417
Samsung SDS Global SCL Australia Pty. Ltd.	11,464,145	14,371,571	(2,907,426)	63,441,418	(2,418,300)
SDS Kerry (Shanghai) Supply Chain Solutions Limited	9,555,521	8,222,853	1,332,668	23,715,843	312,925
VASCO Supply Chain Solutions Private Limited	329,638	73,039	256,599	352,447	(47,571)
SDS-MP Logistics Joint Stock Company	1,843,140	975,210	867,930	4,084,055	108,519
Samsung SDS Global SCL Egypt	17,117,165	5,660,216	11,456,949	29,159,837	1,453,985
Samsung SDS Global SCL South Africa (PTY) Ltd.	4,715,721	4,074,959	640,762	35,221,292	97,298
Samsung SDS Global SCL Nakliyat ve Lojistik Anonim Sirketi	5,069,054	4,143,385	925,669	24,952,339	19,443
Samsung SDS Global Supply Chain Logistics Middle East DWC LLC	6,788,696	4,998,722	1,789,974	38,849,802	(283,270)

- (3) The status of subsidiaries newly included in the preparation of the consolidated financial statements for the year ended December 31, 2018, is as follows:

Location	Name of subsidiaries	Reason
India	VASCO Supply Chain Solutions Private Limited	Newly established
Vietnam	SDS-MP Logistics Joint Stock Company	Newly established
Mexico	INTE-SDS Logistics S.A. de C.V.	Newly established
Republic of Korea	SVIC #39 Investment Partnership	Newly established

13. INVESTMENTS IN ASSOCIATES:

- (1) Details of the Group's investments in associates as of December 31, 2018 and 2017, are as follows:

		Korean won (in thousands)					
		December 31, 2018		December 31, 2017			
	Location	Ownership (%)	Acquisition cost		Book value		Book value
KOREA INFORMATION CERTIFICATE AUTHORITY, INC. (*1)	Korea	6.42	₩ 1,128,139	₩	5,113,828	₩	4,619,156
DongA.com Co., Ltd. (*1)	Korea	18.97	1,306,377		3,209,014		2,895,857
Dunet, Inc. (*1)	Korea	18.01	971,068		80,877		71,447
SERI Technologies, Inc.	Korea	29.00	4,190,500		4,469,959		4,402,038
iMarket Asia Co., Ltd.	China	40.56	18,799,534		31,119,927		28,551,580
Total			₩ 26,395,618	₩	43,993,605	₩	40,540,078

- (*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) Market price information of the marketable investment in associates owned by the Group as of December 31, 2018, is as follows:

		Korean won (in thousands, except for market value per share)			
	Number of shares	Market value per share	Market price		Book value
KOREA INFORMATION CERTIFICATE AUTHORITY, INC.	2,000,000 shares	₩ 3,775	₩ 7,550,000	₩	5,113,828

- (3) Details of changes in investments in associates accounted for using the equity method for the years ended December 31, 2018 and 2017, are as follows:

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	<u>₩40,540,078</u>	<u>₩ 3,026,371</u>	<u>₩ 590,356</u>	<u>₩ (163,200)</u>		<u>₩ 43,993,605</u>

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

December 31, 2017:

Korean won (in thousands)						
	Beginning balance	Share of profit of Associates	Change in associates' equity	Others(*1)		Ending balance
KOREA INFORMATION CERTIFICATE AUTHORITY, INC.	₩ 3,883,642	₩ 293,823	₩ 34,885	₩ 406,806	₩	4,619,156
DongA.com Co., Ltd.	2,561,714	397,230	113	(63,200)		2,895,857
Dunet, Inc.	65,209	6,238	-	-		71,447
SERI Technologies, Inc.	4,244,769	157,269	-	-		4,402,038
iMarket Asia Co., Ltd.	30,209,984	1,099,912	(2,758,316)	-		28,551,580
Total	<u>₩ 40,965,318</u>	<u>₩ 1,954,472</u>	<u>₩ (2,723,318)</u>	<u>₩ 343,606</u>		<u>₩ 40,540,078</u>

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

- (4) Summary of financial information of associates as of and for the years ended December 31, 2018 and 2017, is as follows:

December 31, 2018:

Korean won (in thousands)						
	Total assets	Total liabilities	Total equity	Revenues		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

December 31, 2017:

Korean won (in thousands)						
	Total assets	Total liabilities	Total equity	Revenues		Net income (loss)
KOREA INFORMATION CERTIFICATE AUTHORITY, INC.	₩ 91,120,503	₩ 19,142,502	₩ 71,978,001	₩ 35,694,616	₩	4,480,821
DongA.com Co., Ltd.	17,824,003	2,556,609	15,267,394	19,003,763		2,258,682
Dunet, Inc.	10,758,176	10,361,467	396,709	10,103,396		22,729
SERI Technologies, Inc.	9,234,003	4,609,434	4,624,569	17,928,792		545,982
iMarket Asia Co., Ltd.	128,392,144	74,750,695	53,641,449	575,816,174		3,406,491

- (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, 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	

December 31, 2017:

	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	₩ 71,978,001	₩ 15,267,394	₩ 396,709	₩ 4,624,569	₩ 53,641,449	
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	₩ 4,619,156	₩ 2,895,857	₩ 71,447	₩ 1,341,125	₩ 18,619,122	
Goodwill	-	-	-	3,060,913	9,932,458	
Carrying amount of the Group's interest in the associate	₩ 4,619,156	₩ 2,895,857	₩ 71,447	₩ 4,402,038	₩ 28,551,580	

14. PROPERTY AND EQUIPMENT:

- (1) Details of carrying amounts of property and equipment as of December 31, 2018 and 2017, are as follows:

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

December 31, 2017:

	Korean won (in thousands)					
	Land	Buildings	Machinery and equipment	Others	Construction in progress	Total
Acquisition costs	₩ 118,735,985	₩ 581,102,586	₩ 1,552,343,608	₩ 151,850,237	₩ 5,628,297	₩ 2,409,660,713
Accumulated depreciation	-	(88,746,643)	(1,209,895,901)	(82,460,345)	-	(1,381,102,889)
Net book value	₩ 118,735,985	₩ 492,355,943	₩ 342,447,707	₩ 69,389,892	₩ 5,628,297	₩ 1,028,557,824

(2) Changes in property and equipment for the years ended December 31, 2018 and 2017, are as follows:

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	<u>₩ 118,735,985</u>	<u>₩ 476,581,648</u>	<u>₩ 346,011,349</u>	<u>₩ 64,270,930</u>	<u>₩ 63,125,596</u>	<u>₩ 1,068,725,508</u>

December 31, 2017:

	Korean won (in thousands)					
	Land	Buildings	Machinery and equipment	Others	Construction in progress	Total
Beginning balance	₩ 106,967,216	₩ 507,348,638	₩ 358,092,853	₩ 76,429,857	₩ 3,122,599	₩ 1,051,961,163
Acquisition	-	-	168,899,741	8,590,445	21,205,233	198,695,419
Transfer	11,768,769	1,882,203	1,821,657	3,391,840	(18,699,535)	164,934
Disposal	-	-	(736,178)	(220,016)	-	(956,194)
Depreciation	-	(16,874,898)	(178,631,935)	(18,220,286)	-	(213,727,119)
Others	-	-	(6,998,431)	(581,948)	-	(7,580,379)
Ending balance	<u>₩ 118,735,985</u>	<u>₩ 492,355,943</u>	<u>₩ 342,447,707</u>	<u>₩ 69,389,892</u>	<u>₩ 5,628,297</u>	<u>₩ 1,028,557,824</u>

(3) The Group has machinery insurance and comprehensive property insurance for the damage of building, machinery and vehicles up to the loss of ₩1,746,032 million with Samsung Fire & Marine Insurance Co., Ltd. as of December 31, 2018. The Group is also insured with QBE Insurance (International) Ltd. for up to SGD 11.4 million, Sampo for up to BRL 17 million, Iffco Tokio General Insurance Co., Ltd. for up to INR 145 million and Generali a.s. for up to EUR 1 million.

15. INTANGIBLE ASSETS:

(1) Details of the carrying amounts of intangible assets as of December 31, 2018 and 2017, are as follows:

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	<u>₩ 590,696,864</u>	<u>₩ 71,365,223</u>	<u>₩ 130,006,342</u>	<u>₩ 52,900,677</u>	<u>₩ 844,969,106</u>

(*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, 2017:

	Korean won (in thousands)				
	Goodwill	Development costs	Others (*1)	Software	Total
Acquisition cost	₩ 624,136,978	₩ 282,929,805	₩ 379,951,589	₩ 398,750,794	₩ 1,685,769,166
Accumulated amortization	-	(152,606,618)	(212,426,318)	(325,068,094)	(690,101,030)
Accumulated impairment	(33,631,803)	(25,249,457)	(1,920,874)	(6,501)	(60,808,635)
Net book value	<u>₩ 590,505,175</u>	<u>₩ 105,073,730</u>	<u>₩ 165,604,397</u>	<u>₩ 73,676,199</u>	<u>₩ 934,859,501</u>

(*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, 2018 and 2017, are as follows:

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	<u>₩ 590,696,864</u>	<u>₩ 71,365,223</u>	<u>₩ 130,006,342</u>	<u>₩ 52,900,677</u>	<u>₩ 844,969,106</u>

December 31, 2017:

	Korean won (in thousands)				
	Goodwill	Development costs	Others	Software	Total
Beginning balance	₩ 591,942,866	₩ 152,897,405	₩ 198,658,009	₩ 97,889,466	₩ 1,041,387,746
Acquisition	-	6,634,724	2,697,814	21,689,087	31,021,625
Transfer	-	98,345	60,806	(73,362)	85,789
Disposal	-	-	(195,613)	(36,579)	(232,192)
Amortization	-	(40,512,016)	(34,855,376)	(43,583,562)	(118,950,954)
Others	(1,437,691)	(14,044,728)	(761,243)	(2,208,851)	(18,452,513)
Ending balance	<u>₩ 590,505,175</u>	<u>₩ 105,073,730</u>	<u>₩ 165,604,397</u>	<u>₩ 73,676,199</u>	<u>₩ 934,859,501</u>

- (3) The amortization expenses of intangible assets for the years ended December 31, 2018 and 2017, are presented in the following accounts:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Cost of sales	₩ 52,031,782	₩ 68,565,553
Selling and administrative expenses (*1)	49,217,710	50,385,401
Total	<u>₩ 101,249,492</u>	<u>₩ 118,950,954</u>

- (*1) Research and development expenses of ₩1,437 million and ₩1,446 million are included in selling and administrative expenses for the years ended December 31, 2018 and 2017, respectively.

- (4) The Group recognized research and development expenses amounting to ₩127,394 million and ₩127,072 million for the years ended December 31, 2018 and 2017, respectively.

- (5) Goodwill

Goodwill was allocated to the Group's CGUs (groups) as of December 31, 2018, as follows:

CGU	Korean won (in thousands)	
Samsung Networks, Inc.	₩	417,495,744
MultiCampus Co., Ltd.		43,313,410
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.		4,589,447
SECUi Corp.		43,633,460
Others		2,400,000
Total	<u>₩</u>	<u>590,696,864</u>

The Group performed impairment test on goodwill as of December 31, 2018, considering the changes in CGUs for the year ended December 31, 2018. The recoverable amounts of CGUs (groups) have been determined based on its 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. Based on the impairment test, no goodwill impairment is recorded as the recoverable amount of each CGU exceeded the carrying amount.

The key assumptions used for value-in-use estimation as of December 31, 2018, are as follows:

	<u>Samsung Networks, Inc.</u>	<u>Samsung SNS Co., Ltd.</u>	<u>EXE C&T Co., Ltd.</u>	<u>SECUI Corp.</u>	<u>MultiCampus</u>
Sales growth rate (*1)	1.6%-2.0%	3.5%-3.8%	4.6%-26.1%	4.0%-4.8%	4.0%-4.8%
Long-term sustainable growth rate (*2)	0.0%	0.0%	0.0%	0.0%	0.0%
Discount rate (*3)	7.5%	10.5%	11.4%	11.5%	8.5%

(*1) Weighted-average sales growth rate used to extrapolate cash flows after the budget period was calculated based on experience.

(*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. The discount rates used reflect specific risks relating to the relevant CGU.

(6) Details of impairment on development costs for the year ended December 31, 2018, are as follows:

	<u>Korean won (in thousands)</u>		
	<u>Book value</u>	<u>Impairment Loss</u>	<u>Recoverable amount assessment methods</u>
Project A (*1)	₩ -	₩ (8,907,596)	Fair value

(*1) The Group determined to suspend projects and recognized impairment loss on related book values.

(7) Details of development costs as of December 31, 2018 and 2017, are as follows:

	<u>Korean won (in thousands)</u>		
	<u>December 31, 2018</u>	<u>December 31, 2017</u>	<u>Residual amortization period</u>
Project A	₩ -	₩ 13,018,794	-
Project B	34,812,414	44,527,506	4 years
Project C	25,500,590	36,834,185	3 years
Project D	3,187,728	4,019,002	1 year-4 years
Project E	698,808	1,048,213	2 years
Others	7,165,683	5,626,030	1 year-6 years
Total	<u>₩ 71,365,223</u>	<u>₩ 105,073,730</u>	

16. **BORROWINGS AND CORPORATE BOND:**

Details of borrowings and corporate bond as of December 31, 2018 and 2017, are as follows:

	<u>Financial institutions</u>	<u>Annual interest rates (%)</u>	<u>Korean won (in thousands)</u>	
			<u>December 31, 2018</u>	<u>December 31, 2017</u>
Short-term borrowings:				
Borrowings	CITIBANK	7.7-8.2	₩ 774,724	₩ 820,296
Corporate bond:				
Private placed bond	MG Community Credit Cooperatives	2.6	₩ 10,000	₩ 10,000
Total			<u>₩ 784,724</u>	<u>₩ 830,296</u>

17. PROVISIONS:

(1) Details of provisions as of December 31, 2018 and 2017, are as follows:

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	<u>₩ 18,630,738</u>	<u>₩ 17,195,183</u>	<u>₩ 35,825,921</u>

December 31, 2017:

	Korean won (in thousands)			
	Current	Non-current	Other (*1)	Total
Provision for repairs	₩ 342,416	₩ 854,010	₩ -	₩ 1,196,426
Provision for project losses	-	-	6,921,082	6,921,082
Provision for warranties	1,098,515	-	-	1,098,515
Asset retirement obligation	172,664	13,993,650	-	14,166,314
Provision for business compensation	690,484	-	-	690,484
Others	13,594,973	-	-	13,594,973
Total	<u>₩ 15,899,052</u>	<u>₩ 14,847,660</u>	<u>₩ 6,921,082</u>	<u>₩ 37,667,794</u>

(*1) The Group makes provisions for estimated losses of unfinished projects by adding to advances received or deducting from non-trade receivables.

(2) The changes in provisions for the years ended December 31, 2018 and 2017, are as follows:

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	<u>₩ 37,667,794</u>	<u>₩ 4,299,207</u>	<u>₩ (721,445)</u>	<u>₩ (5,419,635)</u>	<u>₩ 35,825,921</u>

December 31, 2017:

	Korean won (in thousands)				
	Beginning Balance	Increase	Utilization	Reversal	Ending balance
Provision for repairs (*1)	₩ 1,531,172	₩ 153,564	₩ -	₩ (488,310)	₩ 1,196,426
Provision for project losses	24,286,943	598,364	(16,256,001)	(1,708,224)	6,921,082
Provision for warranties (*2)	438,703	60,612	-	(47,877)	451,438
Asset retirement obligation (*3)	12,328,836	1,294,141	(1,422,005)	-	12,200,972
Provision for business compensation	690,484	-	-	-	690,484
Others	6,636,532	7,720,440	(980,000)	-	13,376,972
Total	<u>₩ 45,912,670</u>	<u>₩ 9,827,121</u>	<u>₩ (18,658,006)</u>	<u>₩ (2,244,411)</u>	<u>₩ 34,837,374</u>

(*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.

18. RETIREMENT BENEFIT PLANS:

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

(1) Defined contribution retirement benefit plans

Defined contribution retirement benefit plans of ₩5,922 million and ₩4,320 million were recognized as expense in the consolidated statements of comprehensive income for the years ended December 31, 2018 and 2017, respectively. The Group has unpaid contributions of ₩455 million as of December 31, 2018, and has unpaid contributions of ₩176 million as of December 31, 2017.

(2) Defined benefit retirement benefit plans

1) Net defined benefit liabilities (assets) recognized in the consolidated statements of financial position as of December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Present value of funded defined benefit obligation	₩ 1,024,900,756	₩ 872,125,290
Present value of unfunded defined benefit obligation	21,735,966	19,174,162
	1,046,636,722	891,299,452
Less: fair value of plan assets	(1,005,814,522)	(898,847,921)
Net defined benefit liabilities (assets)	₩ 40,822,200	₩ (7,548,469)

2) Changes in net defined benefit liabilities (assets) for the years ended December 31, 2018 and 2017, are as follows:

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	-	3,702,826
Demographic assumptions	3,702,826	-	6,556,297
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

December 31, 2017:

Korean won (in thousands)			
	Defined benefit obligation	Fair value of plan assets	Net defined benefit liabilities (assets)
Beginning balance	₩ 843,079,123	₩ (867,198,264)	₩ (24,119,141)
Included in profit or loss:			
Current service cost	103,513,708	-	103,513,708
Past service cost	7,624,356	-	7,624,356
Interest cost (income)	28,035,302	(27,634,180)	401,122
Others	-	(5,125,633)	(5,125,633)
	<u>139,173,366</u>	<u>(32,759,813)</u>	<u>106,413,553</u>
Included in OCI:			
Remeasurement elements:			
Actuarial loss (gain) arising from:			
Effect of change in discount rate	(22,345,889)	-	(22,345,889)
Financial assumptions	(32,473,360)	-	(32,473,360)
Demographic assumptions	(248,987)	-	(248,987)
Experience adjustment	8,313,072	-	8,313,072
Return on plan assets	-	13,303,968	13,303,968
	<u>(46,755,164)</u>	<u>13,303,968</u>	<u>(33,451,196)</u>
Others:			
Contributions paid by the employer	-	(77,674,874)	(77,674,874)
Benefits paid	(56,040,815)	69,539,091	13,498,276
Transfer from affiliates	8,984,223	(4,199,662)	4,784,561
Business combinations	1,690,856	-	1,690,856
Others	1,167,863	141,633	1,309,496
	<u>(44,197,873)</u>	<u>(12,193,812)</u>	<u>(56,391,685)</u>
Ending balance	<u>₩ 891,299,452</u>	<u>₩ (898,847,921)</u>	<u>₩ (7,548,469)</u>

3) The principal actuarial assumptions used as of December 31, 2018 and 2017, are as follows:

	Percentage (%)	
	December 31, 2018	December 31, 2017
Discount rate	2.3-3.1	2.0-3.8
Future salary increases (including inflation rate)	3.8-6.2	3.8-5.5

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, 2018 and 2017, are as follows:

Korean won (in thousands)				
	December 31, 2018		December 31, 2017	
	Carrying amounts	Composition (%)	Carrying amounts	Composition (%)
Cash and cash equivalents	₩ 1,002,980,713	99.7	₩ 895,986,245	99.7
Others	2,833,809	0.3	2,861,676	0.3
Total	<u>₩ 1,005,814,522</u>	<u>100.0</u>	<u>₩ 898,847,921</u>	<u>100.0</u>

- 5) The sensitivity analysis of the overall defined benefit liability in accordance with changes to the principal assumptions as of December 31, 2018 and 2017, is as follows:

		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)
		Korean won (in thousands)		
		December 31, 2017		
	Changes in principal assumption		Effect due to increase in principal assumption	Effect due to decrease in principal assumption
Discount rate	1.0% point	₩	(63,238,007)	₩ 72,187,058
Salary growth rate	1.0% point		71,116,841	(71,524,845)

Decreases in corporate bond yields will increase define 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 analyses are 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 statement 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, 2019, amount to ₩121,443 million.
- 7) The weighted-average duration of the defined benefit obligations as of December 31, 2018, is 4.67–7.83 years.

19. COMMITMENTS AND CONTINGENCIES:

(1) Guarantees

Details of guarantees provided for employees by the Group as of December 31, 2018, 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, 2018, are as follows:

Financial institutions	Detail	Korean won (in thousands), USD, CNY, VND, BDT, KWD, EUR, INR, AUD, MYR, EGP, PEN, BRL, AED	Limits	Executed amounts
KEB Hana Bank	Payment guarantee	USD	16,000,000	-
		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 1,786,710
		USD	4,000,000	VND 51,142,900,000
		VND	42,275,000,000	VND 14,573,250,000
				USD 1,000,000
Woori Bank	Payment guarantee	USD	27,000,000	USD 776,000
	Payment guarantee	CNY	6,710,657	CNY 6,710,657
Kookmin Bank	Payment guarantee &			-
	Import letter of credit	USD	20,000,000	USD 1,396,275
	Local letter of credit	KRW	5,000,000	-
HSBC	Payment guarantee	USD	10,000,000	-
	Payment guarantee	KWD	1,050,673	KWD 1,050,673
		USD	5,100,000	USD 550,000
		EUR	2,450,000	-
		INR	620,000,000	INR 168,920,317
	Overseas financing guarantee	AUD	29,000	AUD 29,000
Bank of China	Payment guarantee	USD	18,000,000	-
CITIBANK		KWD	1,661,200	KWD 1,661,200
	Payment guarantee	BDT	145,422,500	BDT 145,422,500
	Overseas financing guarantee	USD	60,000,000	EUR 2,527,757
				MYR 240,000
				EGP 25,000
				USD 145,237
				PEN 50,000
China Merchants Bank	Payment guarantee	CNY	270,000,000	CNY 35,728,480
	Overseas financing guarantee	CNY	30,000,000	-
Banco Bradesco S.A	Payment guarantee	BRL	13,925,522	BRL 13,925,522
Commerzbank AG	Payment guarantee	EUR	17,850	EUR 17,850
Emirates NBD	Payment guarantee	AED	3,885	AED 3,885

(3) 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, 2018. 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, 2018.
- 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 ₩5,200 million in aggregate as of December 31, 2018.
- 3) The Company has a contractual agreement of business-to-business electronic payment system with KEB Hana Bank and three other banks amounting to ₩84,835 million, with a credit limit of ₩340,000 million, as of December 31, 2018.
- 4) The Company has a comprehensive credit limits with KEB Hana Bank to ₩19,300 million as of December 31, 2018.
- 5) The Company has been provided a payment guarantee amounting to ₩456,043 million by Korea Software Financial Cooperative and Seoul Guarantee Insurance Company, and in relation to the guarantee, an equity investment of ₩2,560 million is provided to Korea Software Financial Cooperative as collateral as of December 31, 2018. Domestic subsidiaries of Miracom Inc. and MultiCampus Co., Ltd. are provided with payment guarantees by Korea Software Financial Cooperative amounting to ₩9,492 million and ₩5,120 million, respectively, and each of the subsidiaries has provided equity investment of ₩387 million and ₩206 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 ₩1,734 million, ₩1,009 million and ₩25 million as of December 31, 2018, respectively.

(4) Leases

1) Finance lease

The Group has no lease payments under the finance lease agreements as of December 31, 2018 and 2017.

2) Operating lease

The Group leases vehicles under operating lease arrangements with Samsung Card Co., Ltd., Ethoz, Emozin Sdn. Bhd. and other lessors. The future lease payments under operating leases as of December 31, 2018, are as follows:

	<u>Korean won (in thousands)</u>	
Within 1 year	₩	2,637,919
More than 1 year		632,076

The recognized expenses for the above operating lease arrangements amount to ₩6,381 million and ₩4,738 million for the years ended December 31, 2018 and 2017, respectively.

20. 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 share, 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, 2018, 77,377,800 shares are issued and share capital amounts to ₩38,689 million. As of December 31, 2018, there are no issued convertible debentures, debentures with warrants and participating preferred share, which are non-voting.

21. RETAINED EARNINGS:

(1) Retained earnings as of December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Legal reserve	₩ 40,344,450	₩ 40,344,450
Earned surplus reserve (*1)	19,344,450	19,344,450
Reserve for business development (*2)	21,000,000	21,000,000
Discretionary reserve	10,098,807	10,098,807
Reserve for business rationalization (*3)	10,098,807	10,098,807
Unappropriated retained earnings	4,771,303,565	4,296,604,366
Total	<u>₩ 4,821,746,822</u>	<u>₩ 4,347,047,623</u>

(*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, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Beginning balance	₩ 4,347,047,623	₩ 3,874,712,651
Net income attributable to the owners of the Group	629,399,571	530,347,611
Dividends	(154,700,372)	(58,012,639)
Ending balance	<u>₩ 4,821,746,822</u>	<u>₩ 4,347,047,623</u>

(3) Details of dividends declared for the years ended December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Number of common shares outstanding	77,350,186 shares	77,350,186 shares
Dividend ratio	400%	400%
Dividends	₩ 154,700,372	₩ 154,700,372

22. OTHER COMPONENTS OF EQUITY:

(1) Details of other components of equity as of December 31, 2018 and 2017, are as follows:

		Korean won (in thousands)	
		December 31, 2018	December 31, 2017
Valuation gain (loss) on fair value through other comprehensive income	₩	9,849,833	₩ -
Valuation gain on AFS financial assets		-	2,412,620
Changes in associates' accumulated other comprehensive income		175,980	175,695
Changes in associates' accumulated other comprehensive losses		(268,785)	(858,857)
Foreign currency translation differences		(105,941,898)	(112,335,377)
Treasury stock		(1,592,531)	(1,592,531)
Other capital adjustment		81,019,032	81,707,590
Remeasurement of defined benefit liability		(158,689,196)	(94,433,972)
Total	₩	<u>(175,447,565)</u>	₩ <u>(124,924,832)</u>

(2) Changes in treasury stock for the years ended December 31, 2018 and 2017, are as follows:

		Korean won (in thousands)			
		December 31, 2018		December 31, 2017	
		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	<u>27,614 shares</u>	₩	<u>1,592,531</u>	<u>27,614 shares</u>	₩ <u>1,592,531</u>

The Group acquired 13,515 shares (at ₩56,406 per share) of treasury stocks 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.

23. REVENUE:

(1) Breakdown of revenue for the years ended December 31, 2018 and 2017, is as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Sales of goods	₩ 250,120,482	₩ 223,492,601
IT services (*1)	5,406,553,019	4,906,133,852
Logistics BPO	4,377,545,400	4,169,579,677
Total	<u>₩ 10,034,218,901</u>	<u>₩ 9,299,206,130</u>

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

(2) Details of contract assets and unbilled construction as of December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Installation of software services and etc.	₩ 496,679,115	₩ 30,592,655
Less: allowance for doubtful accounts	(190,000)	-
Total	<u>₩ 496,489,115</u>	<u>₩ 30,592,655</u>
Current	₩ 496,489,115	₩ 30,592,655
Non-current	-	-
Total	<u>₩ 496,489,115</u>	<u>₩ 30,592,655</u>

(3) Impaired receivables of ₩190 million are recognized for Vietnam Ho Chi Minh ITS project among the contract assets as of December 31, 2018. 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 advanced construction billing as of December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Installation of software services and etc. (*1)	₩ 108,499,381	₩ 27,376,703
Total	<u>₩ 108,499,381</u>	<u>₩ 27,376,703</u>
Current	₩ 108,499,381	₩ 27,376,703
Non-current	-	-
Total	<u>₩ 108,499,381</u>	<u>₩ 27,376,703</u>

(*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, 2018.

(6) Changes in estimated total contract costs

Applying the cost-to-cost method which is basis of the total contract amount and total contract cost associated with a contract that recognize revenue over time as of January 1, 2018, the date of initial application of K-IFRS 1115, the effect 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	
Installation of software services and etc.	₩ 10,491,872	₩ (7,112,179)	₩ 11,059,876	₩ 6,544,175	₩ 11,059,876	

The impact on current and future periods is calculated based on total estimated contract costs considering events that occurred until December 31, 2018, after the commencement of the contract and the current estimate of total contract revenue as of December 31, 2018. Estimates of total contract revenue and total contract costs may change in future periods.

24. EXPENSES BY NATURE:

Details of expenses by nature for the years ended December 31, 2018 and 2017, are as follows:

Korean won (in thousands)			
	December 31, 2018	December 31, 2017	
Changes in inventories and purchase of inventories	₩ 576,593,064	₩ 552,502,943	
Wages and salaries	1,888,760,280	1,763,032,720	
Employee welfare	341,767,843	315,959,374	
Depreciation and amortization	308,269,617	332,678,074	
Advertising	3,197,817	2,566,415	
Transportation	2,324,739	2,059,625	
Travel	52,013,308	57,111,664	
Training	65,694,054	62,468,244	
Commission and service charges	519,387,765	407,236,507	
Rent	148,973,594	147,879,714	
Outsourcing	890,203,631	788,424,450	
Communication	193,381,228	205,733,726	
Taxes and dues	31,214,370	24,407,160	
Logistics	3,969,263,775	3,758,694,517	
Others	165,818,003	146,891,848	
Total	₩ 9,156,863,088	₩ 8,567,646,981	

25. SELLING AND ADMINISTRATIVE EXPENSES:

Details of selling and administrative expenses for the years ended December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Wages and salaries	₩ 354,554,985	₩ 336,087,394
Provision for severance indemnities	20,170,390	23,317,076
Employee welfare	76,134,361	73,447,100
Depreciation	19,336,706	22,475,234
Amortization	47,780,421	48,939,392
Repairs and maintenance	2,634,759	6,100,973
Supplies	1,956,450	2,384,081
Utility	1,221,019	1,397,923
Outsourcing	34,965,550	34,868,060
Travel	11,926,881	11,819,779
Communication	1,910,971	1,873,889
Insurance premium	2,363,845	2,127,933
Commission and service charges	33,022,196	28,517,568
Rental	60,102,834	60,592,388
Publication	597,970	531,067
Entertainment	3,492,319	3,301,762
Conference	1,378,932	1,226,783
Training	9,086,570	9,022,545
Recreation	1,505,214	1,324,705
Broadcasting	24,714	204,763
Bad debt	10,314,176	3,833,684
Warranty	1,841,469	1,762,811
Research and development	72,727,094	74,215,051
Miscellaneous expenses	369,734	460,727
Others	17,613,894	13,212,153
Total	₩ 787,033,454	₩ 763,044,841

26. OTHER OPERATING INCOME AND EXPENSES:

(1) Details of other operating income for the years ended December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Commission income	₩ 10,679,999	₩ 9,942,305
Dividend income	15,900	18,175
Gains on disposal of property and equipment	742,049	886,997
Valuation gain on FVPL	1,340,449	-
Gains on disposal of intangible assets	2,863	65,017
Reversal of allowance for doubtful accounts	209,683	9,308
Gain on disposal of valuation of AFS financial assets	-	2,883
Others	16,252,786	30,291,119
Total	₩ 29,243,729	₩ 41,215,804

(2) Details of other operating expenses for the years ended December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Valuation loss on FVPL	₩ 17,817	₩ -
Loss on disposal of valuation of AFS financial assets	-	23,221
Loss on disposal of property and equipment	155,509	281,759
Impairment loss on property and equipment	2,543,393	-
Impairment loss on intangible assets	13,621,577	14,934,093
Loss on disposal of intangible assets	712	190,778
Other bad debt expense	214,995	110,623
Donations	1,972,789	3,242,246
Others	9,584,671	18,468,283
Total	<u>₩ 28,111,463</u>	<u>₩ 37,251,003</u>

27. FINANCE INCOME AND EXPENSE:

(1) Details of finance income and expenses for the years ended December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Finance income:		
Interest income		
Amortized cost	₩ 66,358,435	₩ 42,723,967
Gains on foreign currency transaction	57,595,347	37,722,406
Foreign exchange gains	11,621,991	9,750,851
Total	<u>₩ 135,575,773</u>	<u>₩ 90,197,224</u>
Finance expense:		
Interest expense		
Amortized cost	₩ 1,667,001	₩ 1,900,957
Losses on foreign currency transaction	51,578,625	41,616,916
Foreign exchange losses	7,313,851	32,568,874
Total	<u>₩ 60,559,477</u>	<u>₩ 76,086,747</u>

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

28. INCOME TAX EXPENSE:

(1) The components of income tax expense for the years ended December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Current income taxes	₩ 280,221,815	₩ 190,806,432
Additional income taxes for prior years and other	458,600	(2,804,362)
Deferred income tax arising from temporary differences and other differences	37,058,073	22,321,358
Income tax expense	₩ 317,738,488	₩ 210,323,428

(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, 2018 and 2017, as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Profit before income tax	₩ 956,530,746	₩ 752,095,705
Income tax based on statutory tax rate	245,872,803	161,250,431
Effective tax rate (*1)	25.70%	21.44%
Adjustments:		
Permanent differences	9,295,182	2,097,406
Tax credit	(13,476,211)	(18,840,768)
Tax credit for which no deferred tax asset was recognized	14,983,294	23,202,132
Adjustment related to investments in subsidiaries	26,418,531	26,154,125
Others (*2)	34,644,889	16,460,102
Income tax expense	₩ 317,738,488	₩ 210,323,428
Effective tax rate	33.22%	27.96%

(*1) The Group's statutory tax rate is applied differently according to the tax authorities as of December 31, 2018 and 2017.

(*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 temporary differences and others for the years ended December 31, 2018 and 2017, are as follows:

December 31, 2018:

	Korean won (in thousands)					
	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:						
Loss on valuation of long-term AFS and others	145,337,517	160,741,970	306,079,487	34,079,129	39,442,548	73,521,677
						34,928,673
						(175,950,146)
						₩ (141,021,473)

<December 31, 2017>

	Korean won (in thousands)					
	Temporary differences			Deferred tax assets (liabilities)		
	Beginning	Changes	End	Beginning	Changes	End
Deferred income tax arising from temporary differences:						
Net defined benefit liabilities	₩ (226,048,326)	₩ 15,447,730	₩ (210,600,596)	₩ (54,703,695)	₩ (3,211,469)	₩ (57,915,164)
Investment in associates	(45,536,914)	5,045,709	(40,491,205)	(11,019,933)	(115,148)	(11,135,081)
Reserve for research and human resource development	(16,833,333)	12,166,666	(4,666,667)	(4,073,667)	2,790,334	(1,283,333)
Property and equipment	(61,355,151)	(1,724,330)	(63,079,481)	(14,847,947)	3,455,050	(11,392,897)
Employee welfare fund	(5,204,875)	150,675	(5,054,200)	(1,259,580)	(130,325)	(1,389,905)
Prepaid rent expenses	(7,796,417)	1,090,245	(6,706,172)	(1,886,733)	42,536	(1,844,197)
Investment in subsidiaries	(540,333,472)	(2,399,416)	(542,732,888)	(130,760,700)	(18,490,844)	(149,251,544)
Accrued expenses	82,328,415	(17,212,135)	65,116,280	19,923,476	(2,016,499)	17,906,977
Long-term accrued expense	40,521,841	(10,685,797)	29,836,044	9,806,285	(1,601,373)	8,204,912
Provision	38,585,653	(17,815,736)	20,769,917	9,337,728	(3,626,001)	5,711,727
Deposit	8,172,872	(1,027,846)	7,145,026	1,977,835	(12,953)	1,964,882
Foreign exchange gains and losses	(3,284,739)	15,266,283	11,981,544	(794,907)	4,089,832	3,294,925
Taxes and dues	365,638	17,606	383,244	88,484	16,908	105,392
Others	82,626,390	49,466,181	132,092,571	15,058,439	15,794,876	30,853,315
Subtotal	(653,792,418)	47,785,835	(606,006,583)	(163,154,915)	(3,015,076)	(166,169,991)
Deferred income tax charged directly to shareholders' equity:						
Loss on valuation of long-term AFS and others	176,365,370	(31,027,853)	145,337,517	37,850,295	(3,771,166)	34,079,129
						32,572,487
						(164,663,349)
						₩ (132,090,862)

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, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Temporary differences:		
Valuation gain (loss) on FVOCI	₩ (541,552)	₩ -
Gain on valuation of long-term AFS financial assets	-	190,448
Other capital adjustment	50,992,107	18,869,085
Remeasurement of loss on retirement benefits	255,628,932	143,592,506
	₩ 306,079,487	₩ 162,652,039
Deferred tax assets	₩ 73,521,677	₩ 34,079,129

29. 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, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Net income	₩ 638,792,258	₩ 541,772,277
Adjustment items:		
Foreign exchange losses	7,313,851	32,568,874
Depreciation	207,020,124	213,727,119
Amortization	101,249,492	118,950,954
Provision for severance indemnities	98,219,767	106,413,553
Foreign exchange gains	(11,621,991)	(9,750,851)
Reversal of provision for project loss	(4,574,324)	(1,708,224)
Impairment loss on property and equipment	2,543,393	-
Income tax expense	317,738,488	210,323,428
Others	(21,818,342)	(48,118,298)
	<u>696,070,458</u>	<u>622,406,555</u>

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Changes in operating assets and liabilities:		
Increase in trade receivables	₩ (176,682,671)	₩ (148,847,147)
Decrease in other receivables	75,442,385	26,960,793
Increase in prepaid expenses	(2,791,984)	(5,703,716)
Increase in trade payables	128,524,246	66,764,319
Decrease in other payables	(36,618,933)	(33,715,162)
Increase in accrued expenses	136,833,118	6,763,623
Changes in net defined benefit liabilities	(148,257,009)	(56,391,685)
Decrease in advances received	(10,305,910)	(4,412,662)
Increase(decrease) in withholdings	902,690	(2,810,123)
Others	28,840,767	(43,864,121)
	<u>(4,113,301)</u>	<u>(195,255,881)</u>
Cash flows from operating activities	<u>₩ 1,330,749,415</u>	<u>₩ 968,922,951</u>

- (2) Significant transactions not affecting cash flows for the years ended December 31, 2018 and 2017, are as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
Write-off of accounts receivables and long-term and short-term other receivables by offset of allowance for doubtful accounts.	₩ 4,062,966	₩ 4,425,126
Changes in gain and loss on valuation of FVOCI	10,463,904	-
Changes in gain and loss on valuation of AFS financial assets	-	2,896,088
Transfer of construction in progress	1,337,000	18,699,535
Changes in other payables in connection with acquisition of property and equipment	(2,633,460)	6,626,647
Changes in other payables in connection with acquisition of intangible assets	704,251	336,779

(3) Adjustments of liabilities from financing activities for the year ended December 31, 2018 and 2017, are as follows:

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	<u>₩ 830,296</u>	<u>₩ (45,572)</u>	<u>₩ -</u>	<u>₩ 784,724</u>

December 31, 2017

	Korean won (in thousands)			
	Beginning balance	Transfer	Cash flows	Ending balance
Short-term borrowings	₩ 2,608,483	₩ -	₩ (1,788,187)	₩ 820,296
Current portion of long-term borrowings	2,464,461	1,615,271	(4,079,732)	-
Long-term borrowings	1,615,271	(1,615,271)	-	-
Current portion of corporate bond	-	10,000	-	10,000
Corporate bond	10,000	(10,000)	-	-
Total	<u>₩ 6,698,215</u>	<u>₩ -</u>	<u>₩ (5,867,919)</u>	<u>₩ 830,296</u>

30. 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 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 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 the Group's 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, 2018 and 2017, is as follows:

	Korean won (in thousands)			
	Assets		Liabilities	
	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
USD	617,705,670	457,153,559	209,175,292	214,596,600
EUR	68,053,970	52,713,955	24,318,904	7,491,329
JPY	1,542,136	2,938,838	16,952	330,998

In addition to the major currencies, the Group has other financial assets and liabilities denominated in foreign currency amounting to ₩23,845 million and ₩6,964 million as of December 31, 2018, respectively, and amounting to ₩89,568 million and ₩27,702 million as of December 31, 2017, respectively.

Foreign currency exposure to financial assets and liabilities of a 5% currency rate change against the Korean won as of December 31, 2018 and 2017, 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, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Net income for the year	₩ 20,426,519	₩ 12,127,848	₩ 2,186,753	₩ 2,261,131
Net assets	20,426,519	12,127,848	2,186,753	2,261,131

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, 2018 and 2017 (see note 11).

3) Interest rate risk

The Group is exposed to fair value risk of 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 basis. The Group manages exposed interest rate risk via periodic monitoring and planning.

If the interest rates were 1% higher or 1% lower than the current interest rates, the Group's net income would decrease/increase by ₩7,847 thousand, primarily due the interest rate risk of variable-rate borrowings. This analysis assumes that all other variables remain constant.

(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, 2018 and 2017, is as follows:

	Korean won (in thousands)	
	December 31, 2018	December 31, 2017
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, 2018		December 31, 2017	
		Less than 1 year	1 year– 5 years	Less than 1 year	1 year– 5 years
Financial liabilities:					
Trade and other payables	₩	639,566,939	₩ -	₩ 511,045,515	₩ -
Accrued expenses		530,638,198	51,418,608	423,284,547	38,608,592
Borrowings and corporate bond		774,724	10,000	830,296	-
Other financial liabilities		5,256,149	-	5,828,950	-
		1,176,236,010	51,428,608	940,989,308	38,608,592
Financial guarantee agreement		10,000,000	-	10,000,000	-
Total		<u>₩1,186,236,010</u>	<u>₩ 51,428,608</u>	<u>₩ 950,989,308</u>	<u>₩ 38,608,592</u>

(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, 2017.

The debt-to-equity ratio of the Group as of December 31, 2018 and 2017, is as follows:

		Korean won (in thousands)	
		December 31, 2018	December 31, 2017
Total debt	₩	1,865,297,206	₩ 1,558,331,443
Total equity		6,148,552,184	5,719,429,437
Debt-to-equity ratio		<u>30.34%</u>	<u>27.25%</u>

31. RELATED-PARTY TRANSACTIONS:

(1) The Group's related parties as of December 31, 2018 and 2017, are as follows:

		Ownership (%)	
		December 31, 2018	December 31, 2017
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
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, 2018 and 2017, are as follows:

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 Electronic Digital appliance S.A. de C.V.	189,788,040	47,604
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 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	-
Samsung Electronica da Amazonia Ltda.	323,918,416	2,438,426
Others(*2)	2,201,110,393	43,121,537
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	<u>₩ 7,134,757,474</u>	<u>₩ 88,316,197</u>

(*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.

December 31, 2017:

	Korean won (in thousands)	
	Revenues	Purchase (*1)
Entities with significant influence over the Group:		
Samsung Electronics Co., Ltd.	₩ 2,160,504,724	₩ 40,396,945
Samsung Display Co., Ltd.	195,563,773	10,765
Samsung Electronics America, Inc.	554,674,128	2,222,856
Samsung Electronic Digital appliance S.A. de C.V.	191,160,842	672,100
Samsung Electronics Ltd. (UK)	53,923,995	723,815
Samsung Electronics Europe Logistics	246,077,079	1,601,680
Samsung Electronics Slovakia s.r.o	71,691,564	54,268
Samsung India Electronics Private Ltd.	135,516,657	63,544
Thai Samsung Electronics Co., Ltd.	242,384,050	773,773
Samsung Electronics Vietnam	182,088,689	2,499
Samsung Electronics Huizhou Co., Ltd.	146,171,494	9,086
Samsung(China) Semiconductor Co. Ltd	95,101,093	-
Samsung Electronica da Amazonia Ltda.	300,150,388	1,557,277
Others(*2)	2,261,133,635	47,082,185
Associates:		
iMarket Asia Co., Ltd.	227,639	113,011
KOREA INFORMATION CERTIFICATE AUTHORITY, INC.	119,548	326,002
Dunet, Inc.	-	18,276
SERI Technologies, Inc.	1,122	1,704,834
Total	<u>₩ 6,836,490,420</u>	<u>₩ 97,332,916</u>

(*1) The Group purchased machinery and other equipment of ₩9,451 million from Samsung Electronics Co., Ltd. for the year ended December 31, 2017.

(*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, 2018 and 2017, are as follows:

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	
Others	<u>851,051,610</u>	<u>106,063,083</u>	
Total	<u>₩ 1,422,502,415</u>	<u>₩ 140,291,038</u>	

December 31, 2017:

Korean won (in thousands)			
Revenues		Purchase	
Other related parties:			
Samsung SDI Co., Ltd.	₩ 141,772,373	₩ 185,486	
Samsung Fire & Marine Insurance Co., Ltd.	191,331,546	12,775,163	
Samsung Life Insurance Co., Ltd.	214,604,219	25,283,555	
Others	<u>837,294,533</u>	<u>88,178,478</u>	
Total	<u>₩ 1,385,002,671</u>	<u>₩ 126,422,682</u>	

(3) Receivables from and payables to related parties as of December 31, 2018 and 2017, are as follows:

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 Electronic Digital appliance S.A. de C.V.	18,674,492	77,302	
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 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 HCMC CE Complex Co. Ltd.	16,415,880	222,327	
Samsung Electronics Huizhou Co., Ltd.	9,376,389	7,444	
Samsung(China) Semiconductor Co. Ltd.	80,609,749	5,496,903	
Others (*1)	252,975,643	8,488,900	
Associates:			
iMarket Asia Co., Ltd.	17,440	19,427	
DongA.com Co., Ltd.	7,128	13,692	
SERI Technologies, Inc.	-	1,237	
Total	<u>₩ 1,197,279,250</u>	<u>₩ 48,924,507</u>	

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

December 31, 2017:

	Korean won (in thousands)	
	Receivables	Payables
Entities with significant influence over the Group:		
Samsung Electronics Co., Ltd.	₩ 483,784,259	₩ 45,599,123
Samsung Display Co., Ltd.	48,518,919	1,685,980
Samsung Electronics America, Inc.	21,019,639	645,585
Samsung Electronic Digital appliance S.A. de C.V.	18,504,179	292,339
Samsung Electronics Ltd. (UK)	6,254,078	356,656
Samsung Electronics Europe Logistics	27,955,751	473,443
Samsung Electronics Slovakia s.r.o	4,684,701	56,143
Samsung India Electronics Private Ltd.	22,756,350	397,627
Thai Samsung Electronics Co., Ltd.	15,666,883	1,476,457
Samsung Electronics Vietnam	10,624,407	1,690,058
Samsung Electronics HCMC CE Complex Co. Ltd.	13,010,364	786,457
Samsung Electronics Huizhou Co., Ltd.	8,033,457	342,657
Samsung(China) Semiconductor Co. Ltd.	31,337,715	3,967,647
Others (*1)	426,535,069	29,693,817
Associates:		
iMarket Asia Co., Ltd.	16,937	15,041
Korea Information Certificate Authority, Inc.	8,291	825
Dunet, Inc.	-	280
SERI Technologies, Inc.	-	500,513
Total	<u>₩ 1,138,710,999</u>	<u>₩ 87,980,648</u>

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

Receivables from and payables to other related parties as of December 31, 2018 and 2017, are as follows:

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
Others	177,365,144	38,706,614
Total	<u>₩ 253,756,393</u>	<u>₩ 41,530,662</u>

December 31, 2017

	Korean won (in thousands)	
	Receivables	Payables
Other related parties:		
Samsung SDI Co., Ltd.	₩ 22,309,449	₩ 4,564,221
Samsung Fire & Marine Insurance Co., Ltd.	106,230,327	107,940
Samsung Life Insurance Co., Ltd.	150,586,396	75,989
Others	176,600,713	30,457,646
Total	<u>₩ 455,726,885</u>	<u>₩ 35,205,796</u>

(4) Key management compensation

Key management compensation for the Group's registered executives recognized as expenses for the years ended December 31, 2018 and 2017, is as follows:

	Korean won (in thousands)	
	2018	2017
Short-term benefits	₩ 3,391,282	₩ 3,131,735
Other long-term benefits	3,567,614	1,878,402
Provision for severance indemnities	487,022	514,221
	<u>₩ 7,445,918</u>	<u>₩ 5,524,358</u>

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 ₩375 thousand and ₩718 thousand with respect to receivables from related parties as of December 31, 2018 and 2017, respectively. And the Group reversed ₩343 thousand and ₩14,502 thousand of allowance for doubtful accounts recognized for the years ended December 31, 2018 and 2017, respectively.

32. EARNINGS PER SHARE:

- (1) Basic earnings per share for the years ended December 31, 2018 and 2017, are as follows:

	Korean won	
	December 31, 2018	December 31, 2017
Basic earnings per share	₩ 8,137	₩ 6,856

- (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, 2018	December 31, 2017
Net income attributable to the owners of the Group	₩ 629,399,571	₩ 530,347,611

	Number of shares	
	December 31, 2018	December 31, 2017
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, 2018 and 2017.

33. APPROVAL OF CONSOLIDATED FINANCIAL STATEMENTS:

The consolidated financial statements of the Group as of and for the year ended December 31, 2018, to be submitted to the ordinary shareholders' meeting on March 20, 2019, were finally authorized at the board of directors' meeting on January 24, 2019.

34. EMISSION RIGHTS AND LIABILITIES:

- (1) The quantity of the emission allowances allocated free of charge for the three-year plan period from 2016 to 2018 is as follows:

	Quantity of emission allowances allocated free of charge	
2016	KAU	46,756
2017		43,514
2018		44,428
Total	KAU	134,698

- (2) The changes in the quantity of allowances and carrying value for the years ended December 31, 2018 and 2017, are as follows:

	KAU		Korean won (in thousands)	
	Quantity		Book value	
	2018	2017	2018	2017
Beginning	KAU 27,729	KAU 20,378	₩ 359,915	₩ 364,766
Allocated	44,428	49,772	-	-
Purchase	-	-	-	-
Applied	(39,461)	(42,421)	-	(4,851)
Ending	<u>KAU 32,696</u>	<u>KAU 27,729</u>	<u>₩ 359,915</u>	<u>₩ 359,915</u>

No emission allowances are provided as collateral for the year ended December 31, 2018. The estimated quantity of emission produced for the year ended December 31, 2018, is 44,428 KAU.