I) Accounting Introduction

Process of identifying, measuring and communicating economic information to permit informed judgments by the users of the information (economic reality ⇄ financial statements)

Management accounting → Internal (Managers)
Financial accounting → External (investors)

IFRS or GAAP | IFRS mandatory for Listed Companies having Consolidated FS

↑ worldwide in general ↑ USA, North Korea, Taiwan

→ FS publicly available in a standardized format ⇒ info suitable for Big Data approach

Financial Accounting backs: -TIMING of earnings
-NOT THE AMOUNT

IFRS Framework

Asset	Ressource controlled
Liability	Obligations
Equity	Residual Claims
Revenues	Inflow Economic benefits
Expenses	Outflow Economic benefits
Net Income	Revenues - Expenses

Balance Sheet Equation
Assets = Liability + Share capital + Retained earnings + (Revenue - Expense)

↑ Principle of Double Entry Accounting (DEA):
The recording of every transaction impacts the BS eq. in 2 opposite ways, keeping the eq. always balanced

Timeline:
Dec. relevant accounting period
recording monetary transactions of the accounting period } t
Preparation FS
Calculation net income and income taxes
Shareholders' general meeting
Distrib. dividends and payment income taxes } t+1

Statement of financial position: doc. indicating what the firm owns (resources controlled) and what the firm owes to third parties (obligations and residual claims) at a given point of time

Book value ending BS t (31/12/t) = Book value opening BS t+1 (01/01/t+1)

Statement of comprehensive income: doc. indicating all inflows and outflows of economic benefits during a given accounting period (from 01/01/t to 31/12/t)
↑ Σ: Earnings transactions

Statement of cash flows: doc. indicating all inflows and outflows of cash during a given accounting period
↑ Σ: Cash transactions

II) Accounting statements

Current assets: assets to be realized within one year or assets belonging to the operating cycle

Current liabilities: ____ settled ____

Non-current assets: residual assets

Non-current liabilities: ____ liabilities

Day-to-day activity refers to the operating cycle. Firms buy inputs, transform inputs and sell outputs.

Current items are usually related to clients, employees (excluding pension plan) and suppliers.

Statement of financial position

Assets	Liabilities + Equity
Non-current assets	Non-current liabilities
Tangible assets	Non-current debt
Intangible assets	Pension liabilities
Financial assets	
Current assets	Current liabilities
Inventory	Tax payables
Trade receivables	Trade payables
Cash and equivalents	Current debt
	Equity
	Share Capital
	Retained earnings
	Reserves
	Net income

Statement of comprehensive income

Earnings transactions are allocated to those sections:

- Operating results
- Non-operating (investing) results
- Financial results
- Tax results

IS - by function (what the costs are used for)

Operating
+ Net Sales
- Cost of goods sold (COGS)
= Gross Margin
- General and administrative expenses
- Selling and marketing expenses
= Operating income (EBIT)

Investing
+ Non-operating revenues
- Non-operating expenses

Financing
+ Financial revenues
- Financial expenses
= Earnings before income taxes (EBT)

Tax
- Income taxes
= Net income

IS - by nature (what the money are)

Operating
+ Net Sales
+ Ending inventory finished goods
- Beginning inventory finished goods
= Total Production
- Purchase raw materials
+ Ending inventory raw materials
- Beginning inventory raw materials
- External expenses
= Value added
- Other taxes and similar expenses
- Personal expenses
= EBITDA
- Depreciation Expenses
- Amortization expenses
= Operating income (EBIT)

Formats income statement : (IAS1) ← International Accounting Standards

- by nature : revenue and expenses are directly recorded according to their definition (e.g. depreciation, personnel, purchases expenses, ...)
- by function : ______ are aggregated according to their function (production, selling, administrative expenses, ...)

e.g. : rent manufacturing plant : nature rent expenses function COGS
rent corporate headquarter : general and admin. expenses

→ decision of the format left to the single firm and depends on its accounting system
↳ service firms : by nature (= personnel expenditure)
manufacturing firms : by function (= COGS)

Revenues recognized when : - contract signed
- goods/services transfered to customers
AT THIS MOMENT → - customers pays for the delivery of the goods and services

International Financial Reporting Standards → (IFRS 15)

IFRS 15 Methodology :
1) Identify the contract with a customer ← a valid one needs to be signed (not only an agreement)
2) Identify the performance obligations
3) Determine Transaction price ("consideration")
4) Allocate Transaction price to Performance obligation
5) Recognize revenues as the perf. oblig. are transfered to customers
(Cash settlements irrelevant | Realization : Goods : at t Services : pro rata proportionate to the life contract)

2) Goods OR Services OR Both = Bundled products
↑ concept of ownership ↑ concept of user multiple of them in same contracts

3) Transaction Price = Fixed + Variable Consideration ← anything from bonuses to refunds to ...
↳ contingent on occurence of a future event

4) when multiple Perf. Oblig.s = Bundled Products
⇒ Allocation made by reference to their relative standalone price
↳ if standalone price not directly observable ⇒ entity needs to estimate it ← market assessment approach, expected cost + a margin approach, residual approach

not observable → when not [illegible] approach [illegible] price [illegible] (bonus, revenue-sharing, ...)

Variable Consideration :

the delta Δ = Actual consideration - Estimated Consideration (← At the managerial discretion)

is recognized entirely at THE ACTUAL DATE

III) Accounting Cycle : Recognition

I) Tangible assets

an item of [Property, Plant and Equipment (PPE)] ← Tangible long-term assets that a company:
- owns or controls
- uses in its operations
- for more than one accounting period (> 1 year) ← NOT Inventories, Financial assets, Intangible assets (patents, brands, IP, ...)

that qualifies for recognition as an asset should be measured at its cost

→ Initial Recognition (gross value) = Purchase price + Attributable costs

Anything for it to be capable of operating in the manner intended by management = (delivery, handling costs, prof. fees, initial testing costs, installation and assembly costs, ...)

Value at which an asset appears on the BS

↓

Subsequent measurement : Book value = Cost - Accumulated depreciation - Accumulated impairment losses

(Common depreciation methods: - straight-line - accelerated - output based)

(any unexpected event that reduces the asset's value : - Tech. obsolescence - Market collapse - Damage - Poor perf. ...)

⚠ Land : only tangible asset with indefinite useful life => no depreciation

Depreciation expense = Depreciable amount / Depreciation method

Depreciable amount = Initial recognition - Residual value

Maintenance expenses : (← At the managerial discretion)

Ordinary maintenance : - does NOT increase useful life of a tangible asset
- Expense on the IS

Extraordinary maintenance : - increase useful life of a tangible asset
- New Book value (BS) and New depreciation schedule (IS)

Derecognition when : Disposal of the PPE asset after its useful life for a company

Tangible asset ex. (Session 3 Test 2)

	Cost model	Example 2
Legal Obligation	Acquisition / Prod. date	01/01/t
Initial Recognition	Acqu./Prod. cost + Attributable costs	Acqu. cost 60 M€
Component Analysis	Legal approach to identify all separable components	engines, panel, boards, ...
Useful life	Time period the asset generates economic benefits	4 years
Residual value	Value at the end of useful life	20 M€
Depreciable amount	Initial Recognition - Residual value	40 M€

ex. : ordinary maintenance : annual maintenance → expense on the IS
extraordinary maintenance : replace engines → NEW book value & NEW useful life
special events : Divestitures, impairment test, reversal impairment
↳ sale asset, activity
↳ check whether an asset's book value exceeds its recoverable amount ⇒ ↓ asset's book value
↳ increases the book value when recoverable amount improves, except for goodwill
ex. ↓ the market of an asset recovering to the point that : Market price asset > book value asset
⇒ UNDER IFRS, cannot change the asset's book value ↑

Goodwill : Intangible asset arising from a business combination, measured as the excess of the purchase price over the fair value of identifiable net assets acquired, representing future economic benefits that cannot be separately identified
⚠ IFRS forbid recognizing internally generated goodwill (⇒ no reversal allowed)

II) Intangible assets

Recognized as Intangible Assets only if :
- identifiable (legal protection, transferable)
- controlled by the entity
- future economic benefits expected from the asset
- _____ flow to the entity
- cost of the asset can be measured reliably

⚠ if not met, MUST be recorded as EXPENSES (advertising campaign, employee training, internally generated brand)
...

Depreciation for Tangible Assets / Amortization for Intangible Assets (always linear model)
⚠ Goodwill : Intangible Asset with indefinite useful life ⇒ no Amortization

Acquired items : recognition criteria always met

Internally-generated items : recognition criteria rarely met

⚠ Those items CANNOT be recognized as intangible assets if internally generated : - goodwill
- brands, customer lists and items similar in substance

Those items CAN NEVER be recognized as intangible assets :
- training cost
- advertising and promotional cost

same methods as tangible assets for : - Initial recognition
- subsequent measurement (with amortization) with finite useful life
- amortization exp. = Amortissable amount / useful life (usually residual value = 0)

⚠ subsequent measurements with Infinite useful life (only "external" goodwill and brands) : ANNUAL IMPAIRMENT TEST

III) R&D

R & D expenses :
- R : scientific level
- D : applied level

Research costs : - Basic research
- expense on the IS
- unrelated to the final product

Dev. costs : - applied research
- Internally generated intangible assets (BS + Amort exp)
- Link with the final product

AT THE MANAGERIAL DISCRETION to say if R or D and more

Carrying amount : Value at which an asset or liability is recorded on the balance sheet at a given date
= Historical Cost Accounting − Acc. Depreciation / Amortization

II) KPIs in Accounting

→ for decisions and communication (Investor relations, annual report, investor presentations, management summary...)
→ over time, across peers

Pros : Easy and accessible info about the health of a company

Cons : Superficial information. KPIs are "adjusted figures" and defined at the firm-specific level ⇒ lack of comparability across peers

I) Agenda financial statements analysis

Vertical analysis (composition) : shows the internal structure of FS by expressing each item as a percentage of a total (Revenues IS, Assets BS) ← understand cost structure (IS) Financial structure (BS)

Horizontal analysis (growth) : highlights trends by comparing FS items across periods ⇒ understand trends (IS) and financial dynamics (BS) over time

Return on Capital Employed (ROCE): ← How efficiently does the company generate operating profit from the capital invested in the business

$$ROCE = \frac{NOPAT}{\text{Capital employed}}$$

↳ independent of financing choices (debt vs equity) + exceptional items

NOPAT = Net Operating Profit After Tax = EBIT × (1 − tax rate)

↳ and not net income because it tells how much profit does the core business generate, regardless of how it is financed

Capital Employed CE: Left side view (Assets) ← what the capital is used for (engine components (long term / short term))

(Engine of the business) the capital actually tied up in running the operations of the business

CE = Net non-current assets + Working capital

Right side view (Financing: L+E) ← where the capital comes from (who paid for the engine)

CE = Equity + Debt − Cash

who gave the money: shareholders + lenders | NOT cash because Cash = UNUSED financing capacity

* Net because we consider only the ones used in operations: NET of non-operating items

= operating current assets − operating current liabilities

Working capital = (Current assets − Cash) − (Current liabilities − short-term debt)

Net non-current assets = Non-current assets − (Non current liabilities − long-term debt)

← (Analogy math. induction: $H_0 = H_t$ = now, rolling initial condition)

* Working capital: How much cash needed to keep the business running from one day to the next

← (Analogy math. induction: f to allow $H_{n+1} = f(H_n)$)

Decomposition ROCE: $ROCE = \frac{NOPAT}{CE} = \frac{NOPAT}{Sales} \times \frac{Sales}{CE}$

↳ What drives the performance

$= \underbrace{\text{Operating Margin}}_{\text{Profitability}} \times \underbrace{\text{Capital Turnover}}_{\text{efficiency}}$

Profitability: profit / sale

efficiency: sale / unit of capital

High Operating Margin:
- strong pricing power
- differentiation
- Brand value
- Low cost structure

High Capital turnover:
- assets are used intensively
- Low capital tied up / unit of sales
- Fast operating cycle

II) Inventory in Accounting

Different types of inventory:
- Raw Materials (RM), Work In Progress (WIP) and Finished Goods (FG) } Manufacturing firms
- Merchandise (trading inventory) } Non-manufacturing firms (retailers, wholesalers, ...)

Inventory equation: (in monetary value)

Beginning + Inflows − Outflows = Ending

Purchases

Inflows: recognized on the BS as an asset "inventory" at the acquisition cost

Outflows: ____ IS as an expense COGS at the acquisition cost (IS-by function)

Sales, NOT revenues but what sales cost (everything included)

Perpetual System : IS by function | Periodic System : IS by nature
↳ at any moment how much inventory do I have and what is its cost? | ↳ over the period, how much inventory was consumed and what is the cost & what remains?

Periodic system : Assumption : beginning inventory and purchases will be sold entirely during the accounting period. Then the ending inventory is transferred back to the BS

Inflow : recognized on the IS as an expense "purchase inventory" at the acquisition cost

Adjustment for the "change inventory":
Beginning inventory : expense on the IS
inventory : reduction expense on the IS

Perpetual : costs recognized AT SALE
Periodic : costs recognized BY TYPE & ADJUSTMENT

Valuation Inventory : → many methods to estimate the values of inventory
→ FIFO, Weighted Average Cost (WAC), LIFO (not allowed IFRS only IAS)
→ choice of the method up to the firm
FIFO : firms using periodic inventory system
WAC : most common choice → average price of a unit of inventory

⚠ Cash flows : Did money actually move in or out of the bank account?

Accounting costs : what ressources where consumed to generate revenue during the period?

(ex. : buy groceries today → you pay TODAY → Cash outflow : TODAY (Cash flows)
→ you eat them OVER THE NEXT 10 DAYS → CONSUMPTION (cost) spread over time (Accounting costs))

Rising costs of Inventory : • FIFO : HIGHER income reported / HIGHER ending inventory reported
• LIFO = $\overline{\text{FIFO}}$
• WAC : MEDIUM income reported / MEDIUM ending inventory reported

Falling costs of Inventory = $\overline{\text{Rising costs of inventory}}$

Inventory measured at min (cost, net realizable value) (IAS 2)
↳ can imply write-down of inventory
= NRV possible when : • Obsolescence
• Damage or quality issues
• Market price drops
• Excess inventory
• WIP problems

NRV : how much I can get from selling this unit of inventory
NRV = Selling price − Cost of completion − Cost to sell

⚠ Accounting always favors PRUDENCE (conservatism)
⇒ Assume ALWAYS the MINIMUM reliable outcome

Session 1 Test 3

Assets		Liabilities + Equity	
Cash	1000	Debt	-1000
	-500		
	200	Trade Payable	300 (credit)
Machinery	500		
	300		

Expenses	Revenues
	Revenues 200

Test 4 k€

Assets	Liabilities + Equity	
	Net Income	2000
		-2000
	retained earnings	2000

(*) Net income appropriation = Transfer from IS to BS

Expenses	
Expenses	8000
Net Income	2000

Revenues	
Revenues	10000

Balance Sheet — Income Statement

Test 5 - Accrual Principle: transaction generating positive net income without a positive cash flow

Assets		L+E	
t Trade receivables	10 000	t Net Income	10000
t+1	10 000		0
t+2	-10 000	t+2	
t Cash	0		
t+2	10 000		

Expenses	
Net Income	10 000

Revenues	
revenues	10 000

← Test 7:
Accounting Cycle:
t: initial recognition
t+1: subsequent recognition
t+2: derecognition

IS item: accounting period
BS item: accounting cycle

Test 6 - Fiscal Year End

Assets		L+E	
Cash	600	Prepaid revenues	200 t
			-200 t+1

Expenses	

Revenues	
revenues	400 t
	200 t+1

- Cash Settlement of a Transaction is irrelevant for its recognition

Accrual principle: transactions are recorded when the performance obligations are transferred to customers

- Goods: at a point in time: ownership
- Services (pro rata): allocation during the life of the contract

Test 8 - Book value

Book value of an item in the FS is its carrying amount (always in monetary terms)

↳ Basis of evaluations can be:
- Historic cost - default (acquisition/production cost)
- Fair value - exceptions (exit price)

19)

a $y = c$ (valeurs colonne 1)

$x = c$ (valeurs colonne 2)

lm(formula = $y \sim x$)

b $SSR = \sum_i (\hat{y}_i - \bar{y})^2 = 3.2147$

$SSE = \sum_i (y_i - \hat{y}_i)^2 = 0.4653$

$SST = SSR + SSE =$

Session 2 Test 1

Assets	L + E
Trade Receivables 10000 t 10000 t+1 -10000 t+2	
Cash 0 t 10000 t+2	

Expenses	Revenues
	Revenues 10000 t

Σ Truck left warehouse 01/10/t — Revenue Recognition Rule

Session 2 Test 2 (Services, payment upfront of 600€ — Payment due 01/10/t+2 at 01/03/t)

Assets	L + E
	Prepaid Revenues 200 t -200 t+1
Cash 600 t	

Expenses	Revenues
	Revenues 400 t 200 t+1

Session 2 Test 3 (Same but payment at the end)

Assets	L + E
Accrued Revenues 400 t -400 t+1	
Cash 0 t 600 t+1	

Expenses	Revenues
	Revenues 400 t 200 t+1

← Accrued Revenues NOT Trade Receivables because not backed by any invoices while TR have already been enforced

Session 2 Test 4 (Same as above but variable consideration (1k€ estimate, 1.2k€ in reality) and start date : 01/07/t)

Assets	L + E
Accrued Rev. 500 t -500 t+2	
Cash 0 t 1200 t+3	

Expenses	Revenues
	Revenues 500 t 700 t+1

Diff. between Estimate and reality appear only in Finale Revenues

Session 2 Test 5

Bundled product :
12-month subscr. (20€/month) + free Google chromecast

(upfront 01/07/t)

Standalone selling price ≠ SSAp

12-... = 18,75 €/month
Google... = 25 €

⇒ Perform revenue recognition

⚠ Do not forget to apply the SSAp on our case

1) Identify contract with the customer

2) Identify perf. oblig. : 12-month subscr. + Google chromecast

3) Determine transaction price : 12×20 = 240€

4) Allocate transaction price (TP) to perf. oblige :

SSAp for us :

$TP_{12-...} = 0.9 \times 240 = 216€$

$TP_{Goo...} = 0.1 \times 240 = 24€$

$TP_{SSAp} = 25 + 18,75 \times 11 = 250$ €

⇒ $P_{12-...} = \frac{12 \times 18,75}{250} = 0,9$

$P_{Goo...} = \frac{25}{250} = 0,1$

5)

Assets		L+E	
Cash	240 t	Prepaid Revenues	108 t
			-108 t+1

Expenses	Revenues	
	Revenues	24 t
		108 t
		108 t+1

Session 3 Test 1 (acquire new machinery for 60 M€ 01/01 | fully depreciates in 4 years ⇒ follow cost model & linear depreciation method)

Assets		L+E
Cash	-60M t	
PPE	60M t	
Acc. Depreciation	-15M t	
	-15M t+1	
	-15M t+2	
	-15M t+3	
	-60M	

Expenses	Revenues
Dep. exp.	15M t
	15M t+1
	15M t+2
	15M t+3

Session 3 Test 2 (same but at the end : sold for 20 M€)

BS

Assets		L+E
Cash	-60M t	
	20M t+3	
PPE	60M t	
	-20 t+3	
Acc. dep.	-10M t	
	-10 M t+1	
	-10 M t+2	
	-10 M t+3	
	-40 M	

IS

Expenses	Revenues
Dep. exp.	-10M t
	-10M t+1
	-10M t+2
	-10M t+3

Session 3 Test 3 (same as test 1 but sold at 01/07/t+2 for 35 M€)

Assets		L+E
Cash	-60 t	
	+35 t+2	
PPE	60 t	
	-22,5 t+2	
Acc. Dep.	-15 t	
	-15 t+1	
	-7,5 t+2	
	-37,5	

Expenses		Revenues
Dep. exp.	-15 t	Gain Disposal 12,5
	-15 t+1	
	-7,5 t+2	

⚠ Value of PPE sold is the residual one after depreciation NOT the value at which it is sold ⇒ create a gain Disposal in Revenues or loss Disposal in Expenses

Session 3 Test 4 (50 M€ cash on dev. of internal software : 1) recognized as intangible asset with useful life = 5y 2) recognized as an expense)

1)

Assets		L+E
Cash	-50 t	Net income -10 t
		-10 t+1
		-10 t+2
		-10 t+3
		-10 t+4
Intangible A	50 t	
Acc. Amr.	-10 t	
	-10 t+1	
	-10 t+2	
	-10 t+3	
	-10 t+4	
	-50	

~~Revenues~~ Expenses		Revenues
Amr. exp.	-10 t	
	-10 t+1	
	-10 t+2	
	-10 t+3	
	-10 t+4	

2)

Assets		L+E
Cash	-50 t	Net income -50 t
	0 t+1	

Expenses		Revenues
R&D exp.	50 t	
	0 t+1	

Session 5 Test 1 (Beg. inv. : 200 € purchase merch. : 900 € cash settlement IS by function cost of merch sold : 900 € revenues : 1200 €, cash)

Assets		L+E
Inv	300	
Cash	-900	
	1200	

Expenses		Revenues
COGS	900	Revenues 1200

Session 5 Test 2 (BI : 200 € EI : 300 € PM : 900 €, cash Rev. : 1200 €, cash IS - by nature)

Assets		L+E
Inventory	200	
	-200	
	300	
	300	
Cash	-900	
	1200	

Expenses		Revenues
Change Inventory	200	Revenues 1200
	-300	
Purchase Inventory	900	

Session 5 Test 3 (1st purchase : 10 units, acqu. price : 10 €/u
2nd purchase : 8 units, 12 €/u
1st sale : 15 units, 18 €/u)

1) FIFO

Assets	L+E
Inventory 100 + 96 − 160 = 36	
Cash −100 − 96 + 270 = 74	

Expenses	Revenues
COGS 160	Revenues 270
EBT 110	
Inc. Tax. 44	
Net income 66	

(P ↓ 15%)

⚠ Inventory in monetary value

2) LIFO

Assets	L+E
Inventory 100 + 96 − 166 = 30	
Cash −100 − 96 + 270 = 74	

Expenses	Revenues
COGS 166	Revenues 270
EBT 104	
Inc. Tax. 42	
Net Income 62	

3) WAC : (10×10 + 8×12)/18 ≈ 10.89

Assets	L+E
Inv. 100 + 96 − 163 = 33	
Cash −100 − 96 + 270 = 74	

Expenses	Revenues
COGS 163	Revenues 270
EBT 107	
Inc. Tax. 43	
Net Income 64	

⚠ Net income on the expenses side to balance :

Revenues = Expenses + Net Income