Lesson 4

Business metrics

Structure

1. Definitions
2. Cost classification
3. Fixed and variable costs
4. Earnings and profits

1. Definitions

Revenues

- Revenue, often referred to as sales or the top line, is the money received from normal business operations
- Accounting includes sales made on credit as revenue for goods or services delivered to the customer. Under certain rules, revenue is recognized even if payment has not yet been received.
- Revenue = Quantity Sold x Unit Price

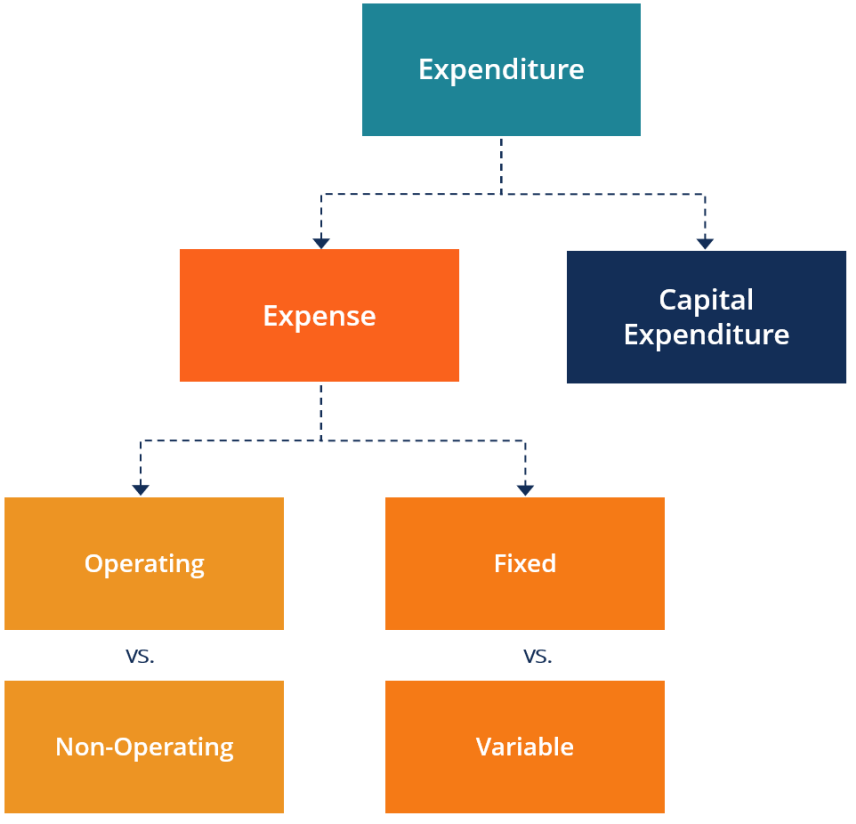
Expenditure

- Payment with either cash or credit to purchase goods or services

Expenses

- Cost of operations that a company incurs to generate revenue

- Expenses are recognized when they are incurred, not necessarily when they are paid for
- Expenses are reported on the income statement



Cost

- Expenditure required to produce or sell a product or get an asset ready for normal use.
- Amount paid to manufacture a product, purchase inventory, sell merchandise or get equipment ready to use in a business process
- Cost and expense frequently intermingled

 video on cost definition (just the first minute)

Profits

- Difference between the revenue received from the sale of an output and the cost of all inputs
- Economic profit vs Accounting profit
- Accounting profit: revenue - expenses. Total earning of a company
- Economic profit: revenues - expenses - opportunity costs
- Accounting profit = net income

Structure

1. Definitions
2. Cost classification
3. Fixed and variable costs
4. Earnings and profits

2. Cost classification by nature

C1. Material costs

C2. External services costs

C3. Depreciation costs

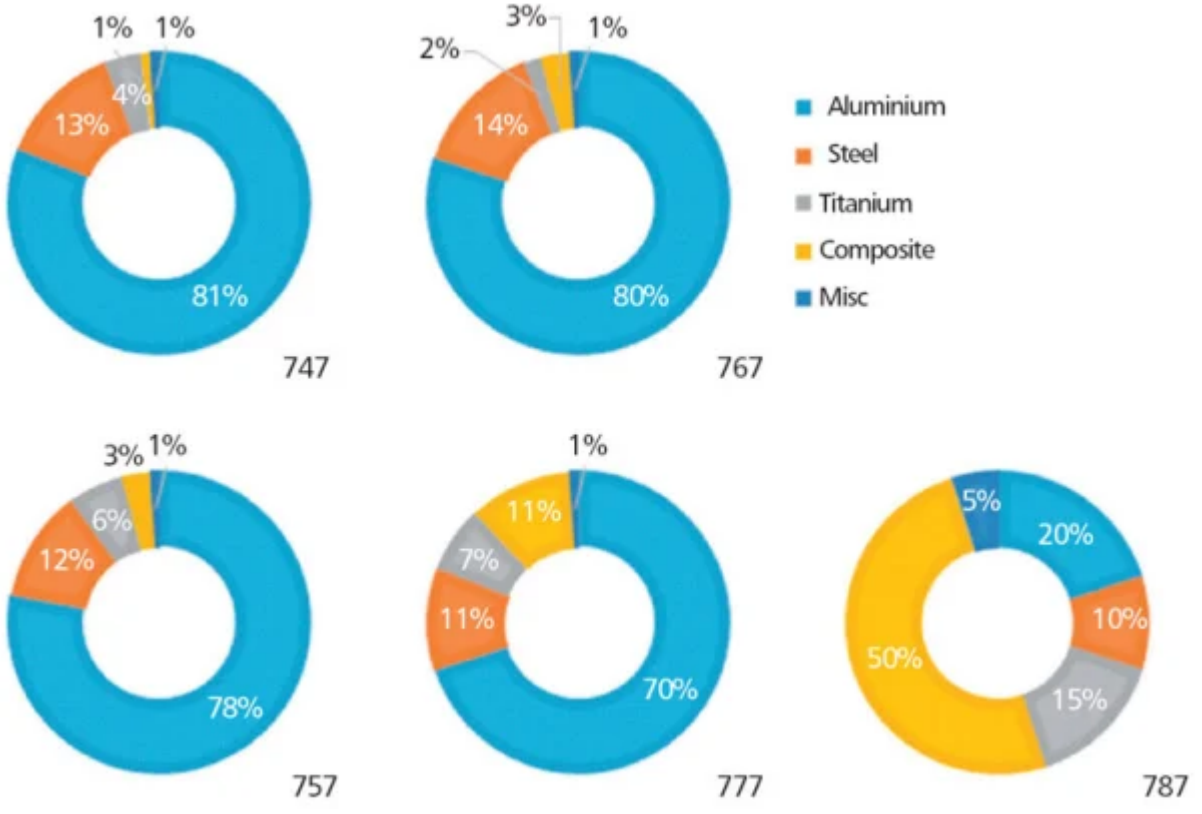
C4. Labour costs

CT. Opportunity costs

C1. Material costs

- Cost of materials used to manufacture a product or provide a service
- Prices paid for raw material components and purchased finished goods, including any packaging necessary for the shipment of products, which are purchased from outside vendors as well as any freight and duty where applicable
- Raw materials, spare parts, sub-assemblies, packaging materials, commodities, etc

Boeing aircrafts raw materials



C1. Material costs II

Sub-assemblies: Aircraft construction begins with the assembling of detail parts into aircraft sub-assemblies. Positioned adjacent to one another these aircraft sub-assemblies make the final assembly of the aircraft. To prevent these aircraft sub-assemblies from a wrong location and position, tooling fixtures are used throughout the assembly process. Tooling fixtures locate the detail parts of aircraft sub-assemblies, and then these are attached to mating aircraft structure (definition from Lockheed Martin Corporation link)

- Aerospace supplier chain tiers:
  - **Tier 1:** major components or systems who receive parts or subassemblies from the Tier 2 supply chain. Engines, control systems, landing gear, braking systems, flight deck, avionics, aerostructures, electronic warfare systems and interior cabin products
  - **Tier 2:** manufacture of parts or subsystem assemblies used by Tier 1 companies. Airfoils and tires, missile nose cones and airframe structures, transmissions and flight controls
  - **Tier 3:** component manufacturers that ship their products directly to Tier2. Hydraulic fittings and hose, instrumentation fittings and tubing, high strength fasteners and pins
- Reading on aerospace supplier chain tiers

C1. Material costs III

Products have extremely long life cycles of 30 years or more, during which they need to provide legacy-parts support.

But the internal components for those systems, including semiconductors, electronic boards, and mechanical parts, have much shorter life cycles, in some cases less than five years.

Because of this disparity—the “two speed” challenge—components can become harder to source over time and even grow obsolete as suppliers struggle to source the raw materials or stop manufacturing them altogether

As a result, manufacturers must design replacements for those obsolete components and face nonrecurring engineering costs as a result.

C1. Material costs IV

Shortly after becoming CEO of Ford Motor Co., the former head of Boeing Commercial Airplanes,

Alan Mulally, was asked if he was ready for the complexity of the automotive industry.

He replied;

“An automobile has about 10,000 moving parts, right? An airplane has 2 million, and it has to stay up in the air,”

C2. External services

Services provided by external providers to the contracting company such as:

Transport and logistics

Maintenance

Leasing

Insurance

Financial services: loans

Accounting

Backoffice

Legal

Tech support

Software development

and others

> Outsourcing. Is it always good?

C3. Depreciations

- Decline in value of assets
- Allocation of the cost of tangible assets to periods in which the assets are used
- Businesses need to account for the consumption of fixed assets over time in a way that reflects their reducing value, this is termed as ‘depreciation’
- Working out depreciation presents problems and requires acknowledge about :
  - Taxation policy
  - Maturity (lifespan)
  - Residual value (scrap value, salvage value)
  - Amount to be depreciated
  - Depreciation method

C3. Depreciation II

Example:

Extracted from How to depreciate property. Publication 946. Department of Treasury:

> You can depreciate most types of tangible property (except land), such as buildings, machinery, vehicles, furniture, and equipment. You can also depreciate certain intangible property, such as patents, copyrights, and computer software.

To be depreciable, the property must meet all the following requirements.

- It must be property of your own
- It must be used in your business or income-producing activity
- It must have a determinable useful life
- It must be expected to last more than one year

C3. Depreciation III

- The fixed assets are valued at the price of acquisition (market price) or at the production cost: purchase cost + expenses (all kind of expenses until the asset is running)
- All fixed assets, with the exception of land, suffer physical depreciation and obsolescence
- The depreciation is an expense (cost) that is accounted in the Income Statement
- Types of depreciation:
  - Physical depreciation
  - Functional depreciation
  - Obsolescence
- The useful economic life of an asset is the total time, measured in years, that the asset is in conditions to produce goods and services. The period in which the asset is expected to be used by the entity in its business

Airport fixed assets depreciation

C3. Depreciations IV

The useful life of an asset will be the lower between:

- Physical or mechanical: timespan without decreasing productivity. Most of the assets suffer from wear and tear: physical deterioration through usage
- Technical life or obsolescence: physical conditions can be right but the asset can be replaced for technological reasons (new models ->higher productivity)
- End of the product life cycle

Obsolescence in avionics: upgrade (retrofit) vs aftermarket (spare sets)

Straight-depreciation method

To estimate the annual depreciation expense (d), you need to know:

- Useful life of the asset (t)
- Cost of the fixed asset (V0)
- Residual value (salvage or scrap value) of the asset (Vr)

Then you can estimate:

- Total depreciation and (book) value of the asset in the period n

Straight-depreciation method II

Being:

- d: annual depreciation $d = \frac{V_0 - V_r}{t}$
- Vo: value of the asset at t=0
- Vr: residual value
- t: lifespan

Accumulated depreciation in the nth year: $D_a = \frac{V_0 - V_r}{t} \cdot n = (V_0 - V_r) \cdot \frac{n}{t}$

Book value of the asset in n-year: $V_n = V_0 - D_a$

Amount to depreciate: $V_p = (V_0 - V_r) - D_a$

Depreciation tables

The Spanish official depreciation tables state (tax purposes):

- The maximum annual rate, constantly applied, it estimates the minimum period for depreciating each asset according to tax regulations
- And the maximum period for depreciating the asset completely

Depreciation tables II

Tipo de elemento	Coeficiente lineal máximo	Periodo de años máximo
Obra civil		
Obra civil general.	2 %	100
Pavimentos.	**6 %**	**34**
Infraestructuras y obras mineras.	7 %	30
Centrales		
Centrales hidráulicas.	2 %	100
Centrales nucleares.	**3 %**	**60**
Centrales de carbón.	4 %	50
Centrales renovables.	**7 %**	**30**
Otras centrales.	5 %	40
Edificios		
Edificios industriales.	3 %	68
Terrenos dedicados exclusivamente a escombreras.	**4 %**	**50**
Almacenes y depósitos (gaseosos, líquidos y sólidos).	7 %	30
Edificios comerciales, administrativos, de servicios y viviendas.	**2 %**	**100**
Instalaciones		
Subestaciones. Redes de transporte y distribución de energía.	5 %	40
Cables.	**7 %**	**30**
Resto instalaciones.	10 %	20
Maquinaria.	**12 %**	**18**
Equipos médicos y asimilados.	15 %	14

Depreciation tables III

Tipo de elemento	Coeficiente lineal máximo	Periodo de años máximo
Elementos de transporte		
Locomotoras, vagones y equipos de tracción.	8 %	25
Buques, aeronaves.	**10 %**	**20**
Elementos de transporte interno.	10 %	20
Elementos de transporte externo.	**16 %**	**14**
Autocamiones.	20 %	10
Mobiliario y enseres		
Mobiliario.	10 %	20
Lencería.	**25 %**	**8**
Cristalería.	50 %	4
Útiles y herramientas.	**25 %**	**8**
Moldes, matrices y modelos.	33 %	6
Otros enseres.	**15 %**	**14**
Equipos electrónicos e informáticos. Sistemas y programas		
Equipos electrónicos.	20 %	10
Equipos para procesos de información.	**25 %**	**8**
Sistemas y programas informáticos.	33 %	6
Producciones cinematográficas, fonográficas, videos y series audiovisuales.	**33 %**	**6**
Otros elementos.	10 %	20

Depreciation in airlines

KLM-Air France | Lufthansa | EasyJet

Aircraft are depreciated using the straight-line method over their average estimated useful life of 20 years, assuming no residual value for most of the aircraft of the fleet. This useful life can, however, be extended to 25 years for some aircraft.

During the operating cycle, and when establishing fleet replacement plans, the Group reviews whether the amortizable base or the useful life should be adjusted and, if necessary, determines whether a residual value should be recognized.

Typical depreciation rate information for different aircraft types

Airline	Aircraft/Fleet Type	Useful life (UL)	Residual Value (RV)	Depreciation Rate (DR = (100%-RV)/UL)
Air Astana	Flight equipment	10-20 years	-	5%-10%
	Rotable spare parts	5-10 years	-	10%-20%
Air China	Core parts	15-30 years	5%	3%-6%
	Airframe and cabin – refurbishment	5-12 years	-	8%-20%
	Overhaul of engine	2-15 years	-	7%-50%
	Rotable parts	3-15 years	-	7%-33%
Air France-KLM Group	Not specified	20-25 years	-	4%-5%
Cathay Pacific	Passenger	20 years	10%	5%
	Freighter	20-27 years	10%-20%	3%-5%
	Aircraft product	5-10 years	-	10%-20%
	Freighters converted from passengers	10 years	-	10%
EasyJet	Aircraft	23 years	-	4%
	Aircraft spares	14 years	-	7%
Emirates Group	New	15 years	10%	6%
	Used	5 years	10%-20%	16%-18%
	Engines and parts	5-15 years	0%-10%	6%-20%

Factor affecting the depreciation rate in airlines

Effective depreciation rates for individual components are determined by the estimated useful life and residual value.

Determining an appropriate depreciation rate is dependent on a number of factors including:

- Intended life of the fleet type being operated by the airline
- Estimate of the economic life from the manufacturer
- Fleet deployment plans including timing of fleet replacements
- Changes in technology
- Repairs and maintenance policies
- Aircraft operating cycles (long-haul aircraft may have a different depreciation profile to high cycle short-haul aircraft)
- Prevailing market prices and the trend in price of second hand and replacement aircraft (which impact the estimate of residual value)
- Aircraft-related fixed asset depreciation rates, for example, rotables and repairables may reflect the airline's ability to use common components across different aircraft types
- Treatment of idle assets
- Distinction between fleet types

Depreciation exercise 1

An airline company is buing a passanger aircraft, specifically a Boeing 737-800 for 82 million $

Build a depreciation table for the following cases:

- Maximum period (Spanish law), no residual value
- AirFrance-KLM: minimum period, 4% residual value

Exercise 2. Depreciation

AirChina is overhauling two engines for 6 million $ each. Assuming a 5-year useful life after the overhauling and a 7% residual value, work out the annual depreciation of both engines

C4. Labour expenses

- The cost of labour is the sum of all wages paid to employees and the cost of employee benefits and payroll taxes paid by an employer
  - Salary
  - Social Security
  - Employee benefits: perks

Human capital or human resources?

C5. Opportunity costs

- The value of the next-best alternative when a decision is made
- Potential forgone profit from a missed opportunity
- The value of what you lose when choosing between two or more options
- What must be given up to obtain something that is desired

Structure

1. Definitions
2. Cost classification
3. Fixed and variable costs
4. Earnings and profits

3. Fixed and variable costs

Variable costs

- A variable cost is an expense that changes in proportion to production output or sales
- When production or sales increase, variable costs increase
- When production or sales decrease, variable costs decrease
- Variable costs are a central part in determining a product's contribution margin
- Examples of variable costs include raw materials, labor, utilities, commission, or distribution costs

Fixed costs

- A cost that does not change with an increase or decrease in the number of goods or services produced or sold
- These costs are set over a specified period of time and do not change with production levels
- They are usually established by contract agreements or schedules
- Once established, fixed costs do not change over the life of an agreement or cost schedule
- Depreciation is one common fixed cost

Structure

1. Definitions
2. Cost classification
3. Fixed and variable costs
4. Earnings and profits

4. Earnings and profits

- EBITDA = Earnings before interest, taxes, depreciation and amortisation
- EBIT = Earnings before interest and taxes
- Both EBIT and EBITDA strip out the cost of debt financing and taxes
- Both focus on the operation side
- Companies with high fixed assets will have higher depreciation and so lower EBIT than companies with lower levels of fixed assets

Earnings and profits II

- Profits
  - Net income for a company or revenus minus expenses
  - Profit (loss) before income tax
  - Profit (loss) after income tax
  - Accounting profit shows the amount of money left over after deducting the explicit costs of running the business
  - Explicit costs include labour, inventory needed for production, and raw materials, together with transportation, production, and sales and marketing costs
  - Accounting profit differs from economic profit as it only represents the monetary expenses a firm pays and the monetary revenue it receives (remember opportunity cost)