Inf2: Software Engineering and Professional Practice
Lecture 8: Organisations

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Developed from a presentation by Aurora Constantin

What is an organisation?

Becoming a Legal Entity

- Types of organisation: commercial, public, not-for-profit.

Becoming a Legal Entity

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Becoming a Legal Entity

- Types of organisation: **commercial**, public, not-for-profit.
- Different subtypes of commercial organisations:
  - Sole trader – individual – no legal formalities – the legal entity is the individual.
    - If turn over is big enough will need to register for VAT etc.
    - The individual is liable for company debts–so assets like home, savings are at risk
  - Partnership – this is the form a group must trade under unless it is a limited company
    - Often the required form of organisation for professionals, e.g. law, medical, hedge fund, etc. because the liability issues control excesses

Becoming a Legal Entity

- Types of organisation: **commercial**, public, not-for-profit.
- Different subtypes of commercial organisations:
  - Limited company: the preferred form of legal entity for commercial firms

Limited companies

- Three principles:
  - Separate legal entity
  - Ownership divided into shares (bought and sold by shareholders)
  - Risk is limited to the value of their shares.
- In the UK:
  - Public limited company (plc): public can hold shares – Tesco plc – shares may or may not be listed on the stock exchange
  - Private limited company (Ltd): shares cannot be held by the public - Small Company Ltd

Setting Up a Limited Company

- Two documents (registered at Company House):
    - Memorandum of Association: short and simple – name, location of the registered office, objects of the company, liability clause (saying the limits to liability of the owners), share capital (e.g. 100 shares, value £1 – to be a plc must have capital over £50K). Concludes with declaration of association that list the people setting up the company.
    - Articles of Association: Complex and technical (see for example: https://www.gov.uk/government/publications/model-articles-for-private-companies-limited-by-shares/model-articles-for-private-companies-limited-by-shares). Covers how the company will run, roles of directors, ...

Directors

- Needed in larger companies

- Directors must have:
  - *domestic obligations* –owed to the company:
    - Have regard to the owners and employees' interests
    - Act in good faith and for the benefit of the company
    - Exercise skill and care (be "professional")
    - Declare conflicts of interest

  - *legal/external obligations*:
    - Be aware of the financial position of the company
    - Draw up annual reports and accounts and filing them at Companies House
    - Complies with relevant law

Directors /2

- Companies have executive (board of directors) and non-executive (members of the board – controlling the directors) directors

- Every company has a company secretary responsible for required communications

Setting up a company

- Not necessary to employ a lawyer or accountant
- "Off the shelf" companies as an easy way
- Registering a company yourself costs £100 (same-day service at the Register of Companies) – this is slower because you need to fill in forms etc.
- UK and US have similar, easy, ways to set up companies. In other countries it can take longer and cost much more.

Non-Commercial Bodies

- Statutory bodies – set up by act of Parliament
- Royal Charter: sets up free-standing bodies that are independent of the state, e.g. Universities
- Not-for-profit organisations (often established as companies limited by guarantee):
  - Charities
  - Professional organisations: BCS, Institute of Physics, …
  - Political Parties

Summary

- Becoming a legal entity – different ways
- What situations are different entities appropriate
- What limited companies are - obligations on limited companies
- Non-commercial bodies

Summary

Organisational models

Organisational models

Bureaucratic model

- Specialist roles, easily substitutable
- One individual – one manger (vertical)
- Formal and impersonal form of communication
- Recruitment is based on qualification
- Protection from arbitrary firing
- Promotion is based on seniority/achievement

Organic (participative) model

- Everyone contributes
- Flat hierarchy
- Equal contribution and open communication
- Everyone actively involved in company-wide decisions
- Everyone responsible for all products
- No clear cut distinction

Organisational models

Matrix model

- Accepts that bureaucratic model is too restrictive
- Work may be project-based
- Employees may be working on several projects simultaneously
- Employees may answer to several managers at once
- Matrix because: centralised (expertise) and decentralised (projects)

Organisational models

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Models and Principles

- **Organisational Models:** the way the work is organised inside a company (organisation of people).

- **Organisational Principles:** values driving the company, how the components of organisations are decided and how they are related (structure of the components of the organization).

- Organisational structure is usually captured in an **organogram.**

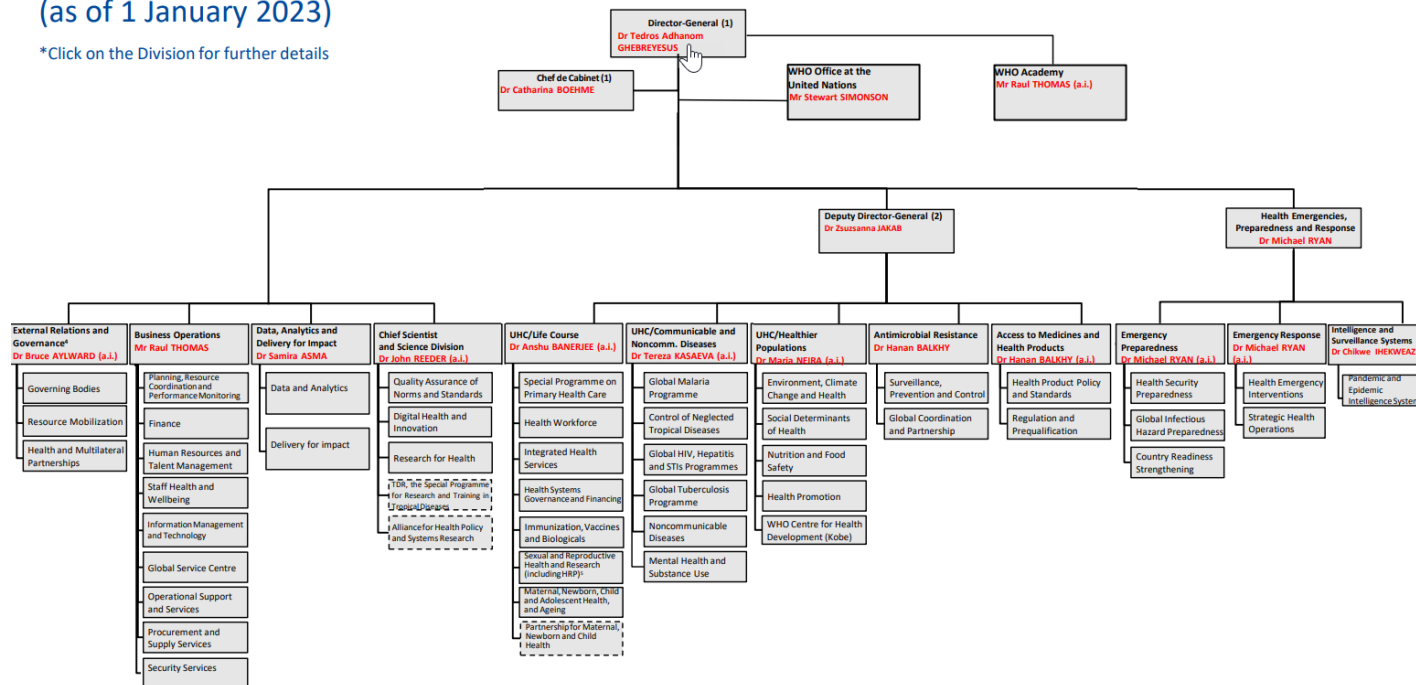# Organogram - some Structuring Principles

- Function
- Geography
- Ownership
- Product Line
- Market Sector
- Technology
- Operational Structure

Organogram examples

World Health Organization Headquarters*
(as of 1 January 2023)

*Click on the Division for further details

Director-General (1)
Dr Tedros Adhanom GHEBREYESUS

Chef de Cabinet (1)
Dr Catharina BOEHME

WHO Office at the United Nations
Mr Stewart SIMONSON

WHO Academy
Mr Raul THOMAS (a.i.)

Deputy Director-General (2)
Dr Zsuzsanna JAKAB

Health Emergencies, Preparedness and Response
Dr Michael RYAN

External Relations and Governance[4]
Dr Bruce AYLWARD (a.i.)
- Governing Bodies
- Resource Mobilization
- Health and Multilateral Partnerships

Business Operations
Mr Raul THOMAS
- Planning, Resource Coordination and Performance Monitoring
- Finance
- Human Resources and Talent Management
- Staff Health and Wellbeing
- Information Management and Technology
- Global Service Centre
- Operational Support and Services
- Procurement and Supply Services
- Security Services

Data, Analytics and Delivery for Impact
Dr Samira ASMA
- Data and Analytics
- Delivery for impact

Chief Scientist and Science Division
Dr John REEDER (a.i.)
- Quality Assurance of Norms and Standards
- Digital Health and Innovation
- Research for Health
- TDR, the Special Programme for Research and Training in Tropical Diseases
- Alliance for Health Policy and Systems Research

UHC/Life Course
Dr Anshu BANERJEE (a.i.)
- Special Programme on Primary Health Care
- Health Workforce
- Integrated Health Services
- Health Systems Governance and Financing
- Immunization, Vaccines and Biologicals
- Sexual and Reproductive Health and Research (including HRP)[5]
- Maternal, Newborn, Child and Adolescent Health, and Ageing
- Partnership for Maternal, Newborn and Child Health

UHC/Communicable and Noncomm. Diseases
Dr Tereza KASAEVA (a.i.)
- Global Malaria Programme
- Control of Neglected Tropical Diseases
- Global HIV, Hepatitis and STIs Programmes
- Global Tuberculosis Programme
- Noncommunicable Diseases
- Mental Health and Substance Use

UHC/Healthier Populations
Dr Maria NEIRA (a.i.)
- Environment, Climate Change and Health
- Social Determinants of Health
- Nutrition and Food Safety
- Health Promotion
- WHO Centre for Health Development (Kobe)

Antimicrobial Resistance
Dr Hanan BALKHY
- Surveillance, Prevention and Control
- Global Coordination and Partnership

Access to Medicines and Health Products
Dr Hanan BALKHY (a.i.)
- Health Product Policy and Standards
- Regulation and Prequalification

Emergency Preparedness
Dr Michael RYAN (a.i.)
- Health Security Preparedness
- Global Infectious Hazard Preparedness
- Country Readiness Strengthening

Emergency Response
Dr Michael RYAN (a.i.)
- Health Emergency Interventions
- Strategic Health Operations

Intelligence and Surveillance Systems
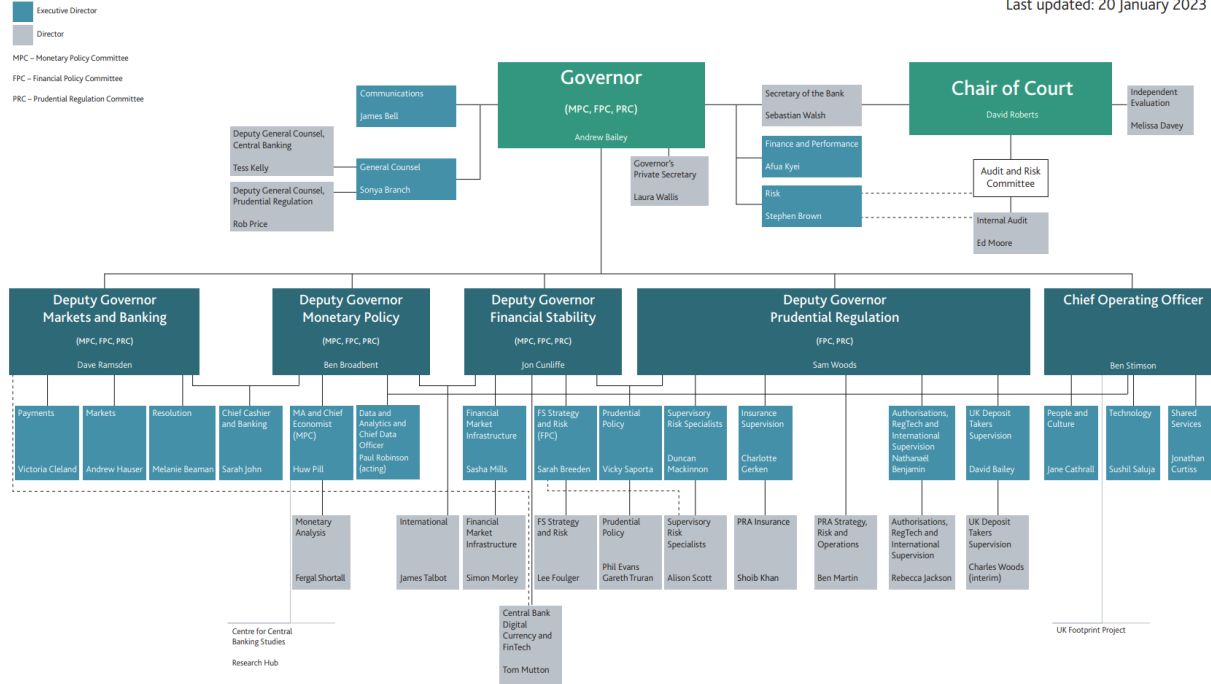Dr Chikwe IHEKWEAZU
- Pandemic and Epidemic Intelligence Systems

https://cdn.who.int/media/docs/default-source/documents/about-us/who-hq-organigram.pdf

Bank of England

Last updated: 20 January 2023

Executive Director
Director
MPC – Monetary Policy Committee
FPC – Financial Policy Committee
PRC – Prudential Regulation Committee

https://www.bankofengland.co.uk/-/media/boe/files/about/people/orgchart.pdf
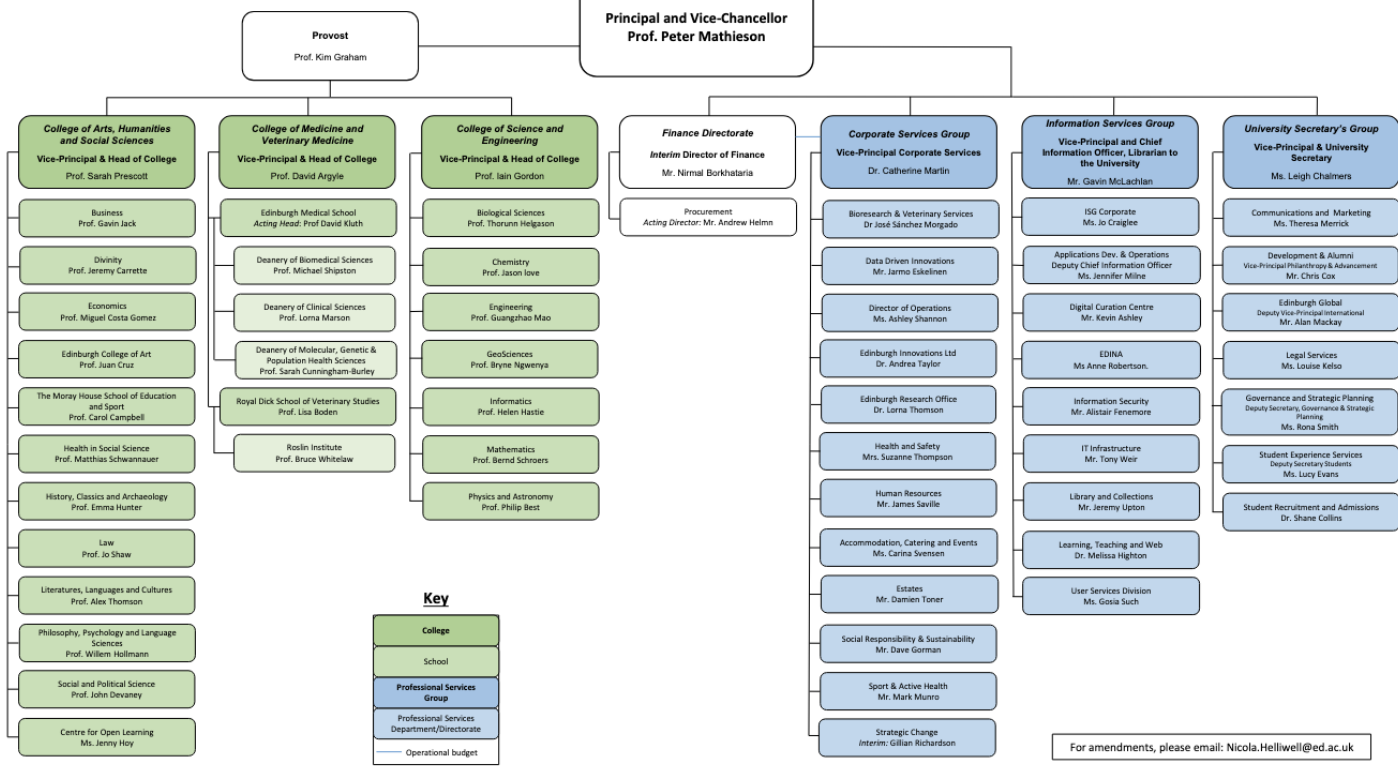
ECB Organigramme

https://www.ecb.europa.eu/ecb/pdf/orga/ECB_organisational_chart.pdf

A.P. Moller - Maersk

University of Edinburgh Organisational Structure as at January 2025

https://www.ed.ac.uk/sites/default/files/atoms/files/orgstruct_0.pdf

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Activity

- Have a look at "the org" website, for example the org chart (organogram) for the company Diageo is here: https://theorg.com/org/diageo

- Choose a company and look at its organisation.

- Think of what organising principle the company has and why you think it has this structure.

Depth of Structure

- the number of layers in the structure
- organisational structures are often described as flat or, in contrast, deep or tall, according to whether the depth is small or large
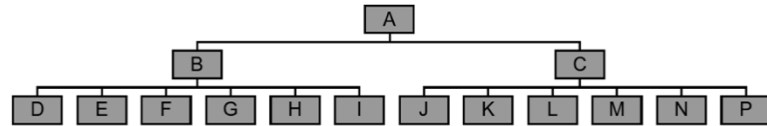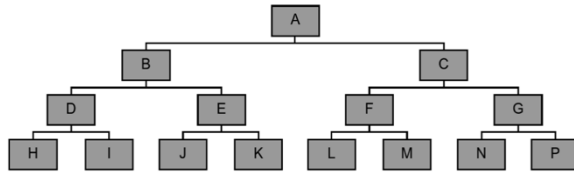
Centralisation

- centralised company
  - as much power as possible is kept at the top of the company, with delegation only when essential

- decentralised company
  - as much power and control as possible is delegated to the lowest level

Relation size of company and appropriate structure

- small company – service functions

- big company – more oriented towards the market

The Guardian on VW "Dieselgate"

Volkswagen has made sweeping changes to its senior management team as it attempts to cut costs and overhaul its culture following the diesel emissions scandal.
The German carmaker has almost halved the number of senior managers reporting directly to Matthias Müller, the chief executive, and brought in several new faces.
Müller has pledged to transform the notoriously unwieldy structure of VW after the company admitted that the emissions scandal had occurred because of a "whole chain" of errors and a corporate mindset that tolerated rule-breaking.
He said the management changes would "speed up the decision-making process, reduce complexity and increase efficiency".

https://www.theguardian.com/business/2015/dec/17/vv-management-changes-emissions-scandal-german-carmaker

VW Response to Dieselgate

- Early alignment of the product portfolio with legal requirement
- Guidelines for the development of software with the legal requirements
- Uniform process standards and work instructions that give those involved legal certainty in the work process
- Training programs
- Regular reporting for more transparency
- Introduction of multiple controls for approvals in the product development process
- **Reorganization within Development: separating responsibility**
- **Formation of new bodies for cross-brand management and clarification of compliance issues**

Summary

- Organisational structure is essential for larger organisations
- Structure according to business priorities
- All business structures make it difficult for the organisation to respond to some risks.
- Structure to facilitate business and make it easy to respond to the most likely serious risk.

Activity

Anna works for SofTrade, a company that writes software for other trading companies. Anna is junior software tester at the company. She is responsible for tests of features written in Java. Anna is a member of an eight-people team. However, she doesn't get to communicate much with other team members except for her line manager. SofTrade ensures strict lines of communication.

Anna has a clear path to promotion: in two years, provided that she completes her goals, she will get promoted to a senior software tester.

Managers and Leaders

Managers and Leaders

One day you might become a manager or a director or a leader

- What does that *mean* exactly?
- What issues should you be sensitive to?
  - Seniority is important in determining this.
  - Managers will often be involved in operational matters.
  - Directors and leaders can be more strategic and policy-oriented

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Pause for Thought

- Managers and Leaders
- What would you expect of:
  - A manager
  - A leader
- In terms of:
  - The activity they carry out.
  - Their personal characteristics and skills.

The Manager

- Develops plans and timetables
- Organises
- Delegates and monitors
- Exercises control, applies corrective action
- Communicates
- Motivates
- Delivers (predictable)
- Looks inwards

A leader can emerge …

- Perceived by group as most competent in leadership functions

- Task-orientated: coordinating, initiating contributions, evaluating, information seeking and giving, opinion seeking and giving, motivating

- Socio-emotional: reconciling differences, arbitrating, encouraging participation, increasing cohesion

The Leader

- Establishes direction
- Develops vision
- Communicates and inspires vision
- Energises others
- Innovates
- Figurehead, Spokesperson
- Looks outwards

Summary

- Managers manage, leaders lead
- Managers have a specific role within the organisational structure:
  - Replaceable
  - Trainable
- Leaders provide direction, may arise from anywhere:
  - Not easily replaceable
  - Not trainable

Controlling Organisations

Organisation

- A company is an instrument for maximising value for the shareholders
- Driven by markets
  - lack of understanding of market = no customers = no business
- Driven by resources
  - lack of understanding = lack of control
- The more senior you become the more these will be concerns
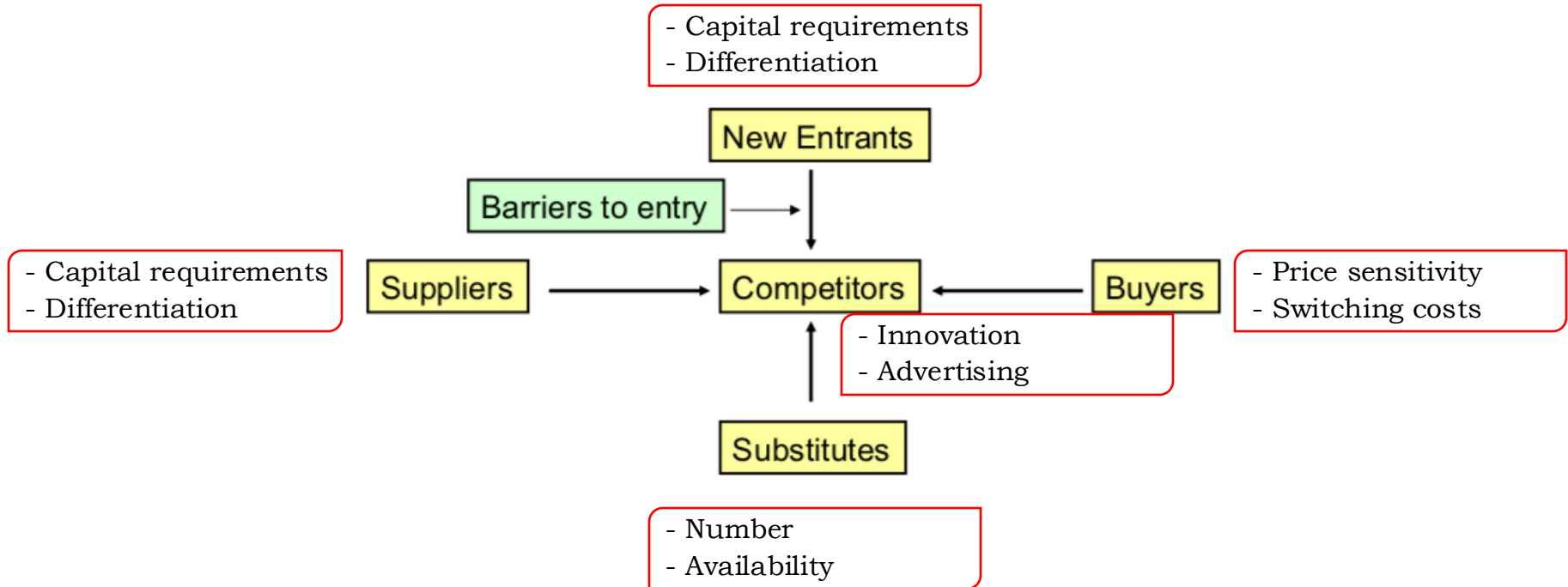
Performance areas (Drucker)

- Market standing
- Innovation
- Productivity
- Physical and financial resources
- Profitability
- Worker performance and attitudes
- Manager performance and development
- Public responsibility

Markets and Marketing

- Not just advertising
- Understanding your market
- What are your opportunities?
- … threats?
- ... competitors?
- … customers?

Porter's 5 forces

- Capital requirements
- Differentiation

New Entrants

Barriers to entry

- Capital requirements
- Differentiation

Suppliers → **Competitors** ← **Buyers**

- Price sensitivity
- Switching costs

- Innovation
- Advertising

Substitutes

- Number
- Availability

Examples

- New Entrant: Ford – Tesla, ChatGPT – DeepSeek
- Substitute: Vinyl record – CD – iTunes - Spotify
- Control of suppliers – Tesco
- Control of buyers – monopoly
- Control by buyers – perfect market; eBay?
- Barriers to entry – Semiconductor industry – mobile phones...

Porter's 5 forces – Activity

The new company **CodeFlow Solutions (Ltd)** wishes to launch an integrated development environment (IDE) software that specifically caters to beginners, hobbyists, and educational institutions. CodeFlow's product is designed to help new coders learn programming languages more quickly, offering features like real-time assistance, error diagnostics, AI-based code suggestions, and a learning assistant that guides through coding challenges and projects.

CodeFlow operates in the competitive market of development tools, which is becoming increasingly crowded as the demand for easy-to-use coding tools rises with the surge in global digital literacy initiatives and coding bootcamps. While there are major players in the market like Microsoft's Visual Studio, Codecademy, and JetBrains, CodeFlow tries to differentiate itself by integrating educational features directly into the IDE.

P.E.S.T. / S.W.O.T.

- Political

- Economic

- Social

- Technological

- Strengths

- Weaknesses (internal)

- Opportunities

- Threats (external)

P.E.S.T. – car market

- Political – emissions reduction targets
  - Works against internal combustion engines
- Economic – control of rare earth mineral production
  - Raises concerns over electric vehicles
- Social – family size, behaviour
  - 1-parent families – hatchbacks?
  - Millenials: Transport as a service
- Technological – new products
  - Hydrogen, hybrids, recyclable materials

Marketing Mix – the 4 * Ps

- Product
  - Quality, features, name, packaging, services, guarantee
- Price
  - List price, discounts, credit
- Promotion
  - Advertising, personal selling
- Place
  - Distributors, retailers, locations, transport

Marketing Mix – the 4 * Ps – Activity

Company Name: SmartHome Hub Ltd.

Industry: Home Automation Technology

Product: A smart home device called "HomeAssistant" that integrates various home automation functions (lighting, heating, security, appliances) into a single user-friendly interface accessible via smartphones and voice commands.

Market Scenario: With the increasing popularity of smart home devices, SmartHome Hub is positioned in a rapidly growing market competing with big names like Google Home, Amazon Echo, and Apple HomeKit. HomeAssistant aims to offer superior customization options allowing integration with a broader range of third-party devices and emphasizing data privacy and security, as well as a more luxurious experience.

Competition

- Can compete on *cost* or *differentiation:*
  - Cost: make the same thing cheaper
  - Differentiation: make it different / better / here
- Competitiveness based on core competencies
  - Anyone can make Coca-Cola
    - Only they have the network of licensed manufacturers and distributors (and the brand name)
  - Anyone can put an aircraft in the sky
    - Only the profitable airlines can fill it every time
- Each survivor is uniquely superior to all others in some way and thus occupies a niche

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Exercise

- You are **StackOverflow**

- Consider the market you are in, perform a PEST analysis and indicate what market repositioning might be advantageous

S.W.O.T.

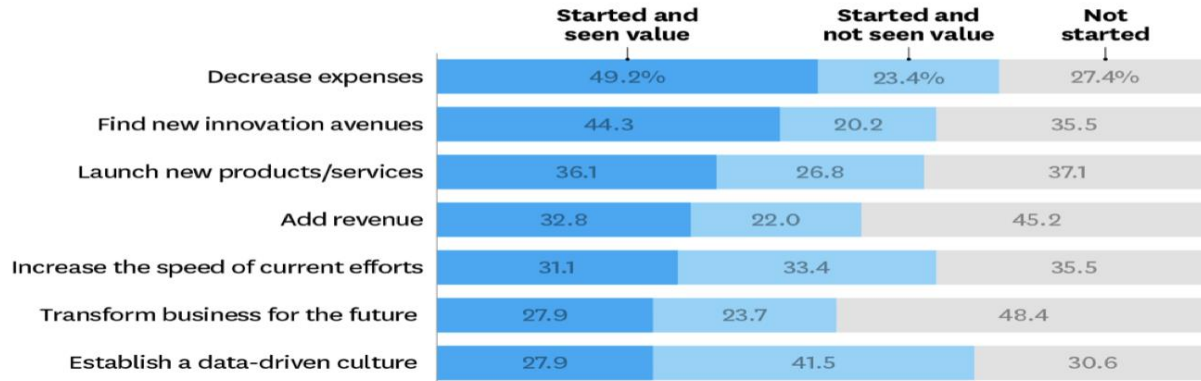StackOverflow, in the age of LLMs

- Strength: has expert answers and voting system
- Weakness: product is static
- Threat: LLMs might make product obsolete
- Opportunity: reposition via incorporating LLMs/expert answers

Data (this is an old chart, but progress is slow)

How Fortune 1000 Executives Report Using Big Data
The projects they've started, and where they're finding value.

	Started and seen value	Started and not seen value	Not started
Decrease expenses	49.2%	23.4%	27.4%
Find new innovation avenues	44.3	20.2	35.5
Launch new products/services	36.1	26.8	37.1
Add revenue	32.8	22.0	45.2
Increase the speed of current efforts	31.1	33.4	35.5
Transform business for the future	27.9	23.7	48.4
Establish a data-driven culture	27.9	41.5	30.6

SOURCE NEWVANTAGE PARTNERS BIG DATA EXECUTIVE SURVEY, 2017   © HBR.ORG

Summary

- Successful organizations know their markets
- Successful organizations are sensitive to changes in markets
- Successful organisations measure what is going on in markets
- Companies use data to support strategic decisions (and this is changing rapidly).