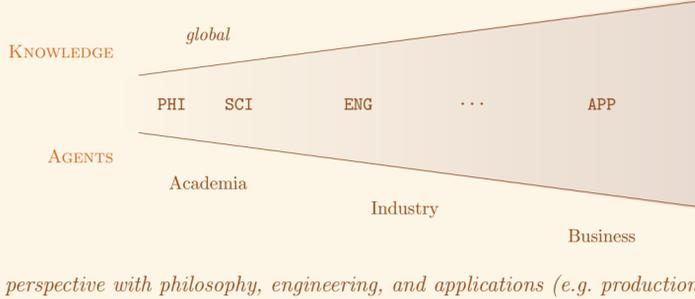


Note

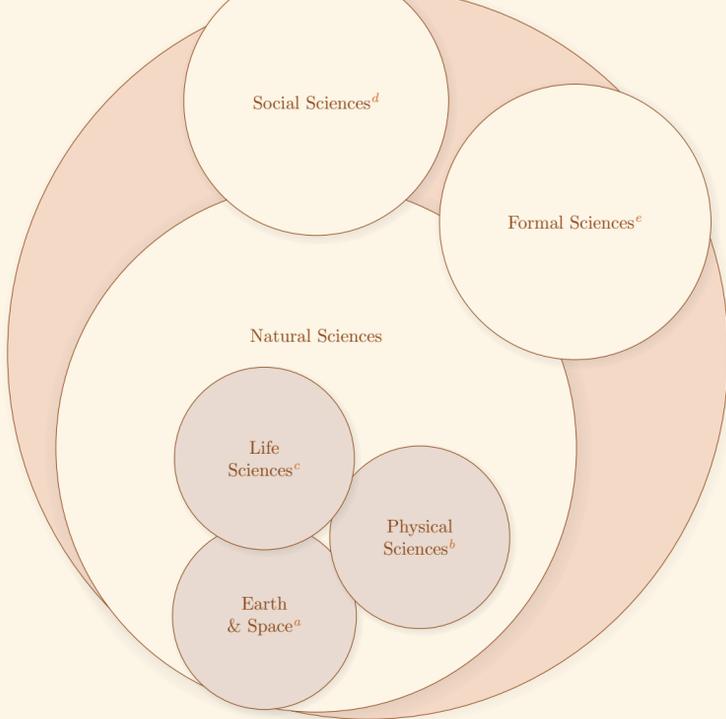
Science (from *scientia* [L], knowledge, skill) and its equivalent επιστήμη (from επιστάσθαι [Gk], to know, know how to do) point to a body of *trustworthy* knowledge. Obtaining and maintaining this body of knowledge is entrusted to ‘scientific research’. This folio summarises essential features of science, such as its context (§ 1), specialisations (§ 2), method (§ 3), and rigour (§ 4).

1 Context



Science in perspective with philosophy, engineering, and applications (e.g. production, management, administration) and correspondence with typical agents

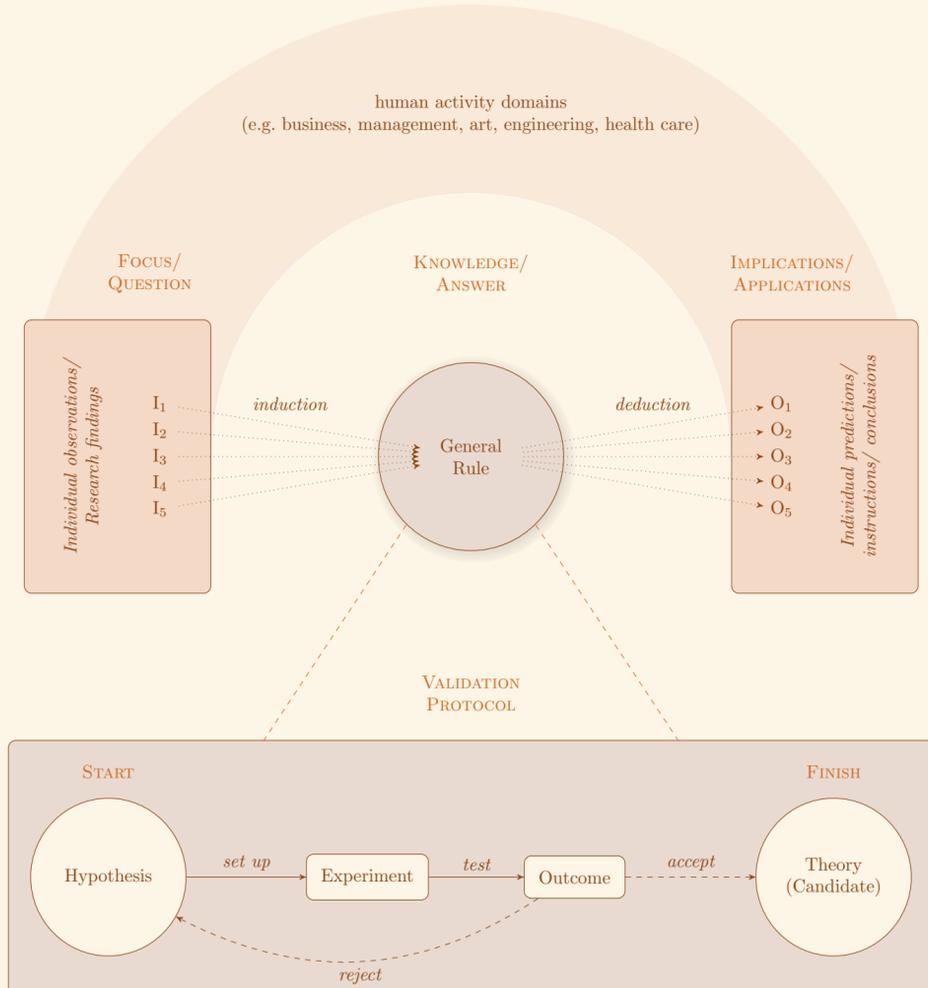
2 Specialisation



Knowledge specialised by field

- ^a e.g. Geology, Astronomy
- ^b e.g. Physics, Chemistry
- ^c e.g. Biology
- ^d e.g. Psychology, Sociology
- ^e e.g. Mathematics, Logic

3 Protocol



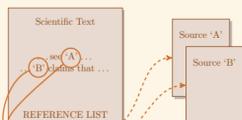
The ‘scientific method’ gives special attention to the validation protocol (Perdicoulis, 2013b)

- NB 1 The all-important *induction* remains beyond strict scrutiny (Perdicoulis, 2013c)
- NB 2 ‘Empirical’ *validation* protocols may occasionally take place in ‘practical’ domains such as engineering, planning, military operations, or in emergency situations
- NB 3 Even after corroboration, theories tend to remain valid only for a limited time (Kuhn, 1996)

4 Rigour

The scientific *operations* — e.g. formulation of hypotheses (Perdicoulis, 2012a), proof by the ‘scientific method’ (Perdicoulis, 2013b,c) — require a procedural rigour built into the protocol (§ 3), while the *register and transmission* of related knowledge, understanding, information, and/ or data (Perdicoulis, 2013a) require a thoroughness known as ‘scientific rigour’ (Perdicoulis, 2012b).

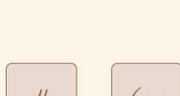
4.1 Traceability



Traceability: *internal* (solid) and *external* (dashed) references (Perdicoulis, 2012b, 2014b)

AILMENT — uncertainty [re: source identification]

4.2 Objectivity



Objectivity: *facts and/ or referenced assessments* (Perdicoulis, 2012b)

AILMENT — uncertainty [re: facts, criteria]

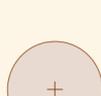
4.3 Exactness — Accuracy & Precision

Accuracy^a and precision^b are applicable to measurement as well as to the register and transmission of data, information and — more comprehensively — knowledge (e.g. argumentation), and can be invoked simultaneously as ‘exactness’^c (Perdicoulis, 2012b).

In the case of measurement, when the use of an instrument or device marked in standard units is not possible for the obtention of a value, then an *estimate* (e.g. by sampling, forecasting, or expert opinion) may be a viable alternative.

Arguments, complex objects, and dynamic situations are generally best *described* rather than computationally reduced to unidimensional or dimensionless *indices*, or even to lists of unrelated *indicators* (Perdicoulis, 2014c; Perdicoulis and Glasson, 2011).

- ^a ACCURACY (from *ad-* [L], towards + *cura* [L], care) Objective correctness, ‘to the point’, at the right value
- ^b PRECISION (from *prae* [L], in advance + *caedere* [L], to cut) Coherence, appropriate resolution/ definition
- ^c EXACTNESS (from *ex-* [L], thoroughly + *agere* [L], to act, perform) High performance, reliability, certainty



Exact (*i.e. both accurate and precise*) communication — cf. Perdicoulis, 2012b, 2014d

- EXACTNESS AILMENT — uncertainty [re: knowledge; source content]
- ACCURACY AILMENTS — systematic error [re: measurement]; factuality [re: argument]
- PRECISION AILMENTS — random error [re: measurement]; dilution [re: argument]

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