Summary – Chapter 2: Concepts and Definitions for Identifying R&D (OECD, 2015)

1. What is R&D?

- **Definition:** Creative and systematic work to increase knowledge (of people, culture, society, science) and create new applications.

- **Types of R&D:**
    1. **Basic research** → Seeks new knowledge without immediate application.
    2. **Applied research** → New knowledge with a specific practical aim.
    3. **Experimental development** → Systematic use of knowledge to make new/improved products or processes.

2. Core Criteria for Identifying R&D

An activity is R&D if it meets all **five criteria**:

1. **Novel** → Aimed at new findings.
2. **Creative** → Based on original ideas, not routine.
3. **Uncertain** → Outcome, time, and cost unpredictable.
4. **Systematic** → Planned, budgeted, documented.
5. **Transferable/Reproducible** → Knowledge can be shared, reproduced, or codified.

3. Distinguishing R&D from Non-R&D

- **Included examples:**
    - Testing new drugs in clinical trials (phases 1–3).
    - Developing new software algorithms, AI models, or encryption methods.
    - Designing prototypes/pilot plants if main goal is research.
    - Feedback R&D (fixing problems discovered post-deployment).
- **Excluded examples:**
    - Routine data collection (e.g., weather or census surveys).
    - Market research, patent administration, feasibility studies.
    - Routine software updates or website development using known tools.
    - Artistic performance (not reproducible knowledge).

4. Boundaries and Special Cases

- **Software Development:** Only R&D if it solves scientific/technical uncertainty (e.g., new AI algorithm). Not R&D if just adding features or debugging.
- **Design:** Creative design ≠ R&D unless it addresses novelty & uncertainty.
- **Services R&D:** Harder to identify; look for novelty, systematic process, and transferable outcomes (e.g., new methods for measuring patient outcomes in healthcare).
- **Education & Training:** Doctoral research counts, but routine teaching doesn't.
- **Arts & Humanities:** Research on the arts counts (e.g., historical analysis), but artistic expression itself does not.
- **Traditional Knowledge:** Included only if studied using scientific methods (e.g., testing plant-based remedies).

5. Fields of Research and Development (FORD) Classification

OECD groups R&D into 6 broad fields:

1. **Natural sciences** (maths, computer science, biology).
2. **Engineering & technology** (IT, medical engineering, nanotech).
3. **Medical & health sciences** (clinical medicine, health sciences).
4. **Agricultural sciences**.
5. **Social sciences** (psychology, economics, education, media studies).
6. **Humanities & arts** (history, philosophy, music).

6. Practical Implications for Students & Researchers

- **Why is it important?** Helps decide if your project is "real research" for academic/industry recognition.
- **In REM502 context:**
    - Your *ClinicTrends AI* project fits **applied research** (new knowledge with a business/healthcare aim).
    - Using AI for patient sentiment analysis fits **experimental development** (testing algorithms for real-world use).
    - If you explore theoretical ML models without application, that would be **basic research**.

✅ **In short:**

R&D is about generating new, systematic, uncertain, creative, and transferable knowledge. It's broader than just "lab science" — it includes AI, healthcare analytics, and even social sciences, but excludes routine work.