Lecture 1 - Digital Ecosystems

> **Ecosystems are networks (constellations) of multiple actors involved in value exchange and creation.**
>
> - **Digital ecosystems** = interconnected networks of actors (firms, users, platforms, etc.) exchanging value and co-creating through digital interactions.

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- These ecosystems rely on **complex relationships** beyond single-industry boundaries.
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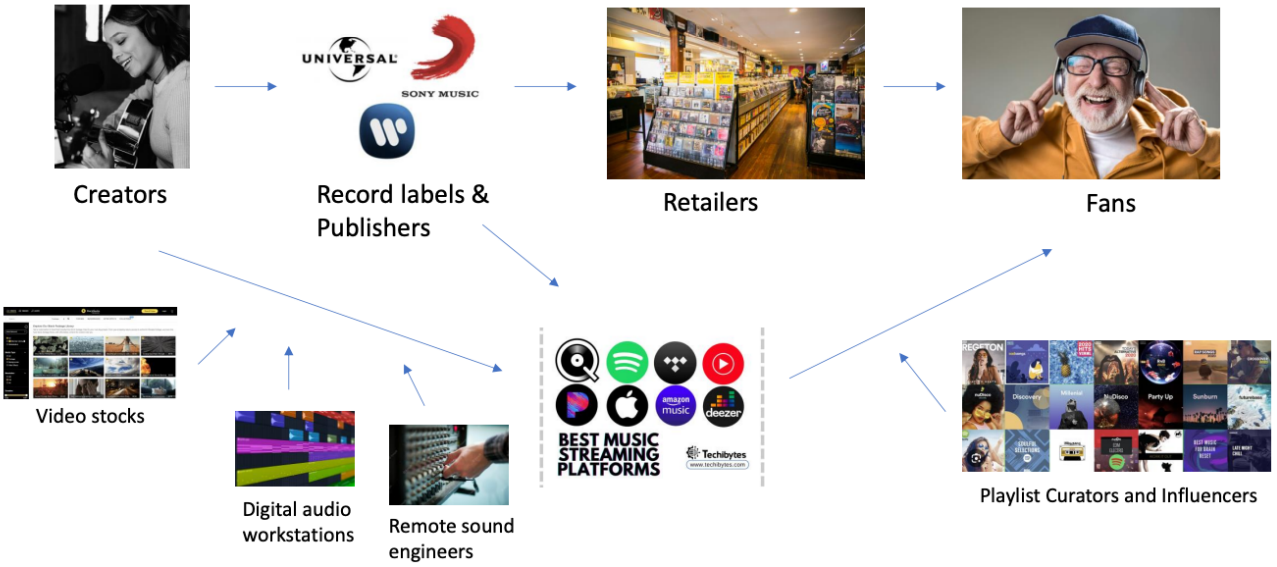
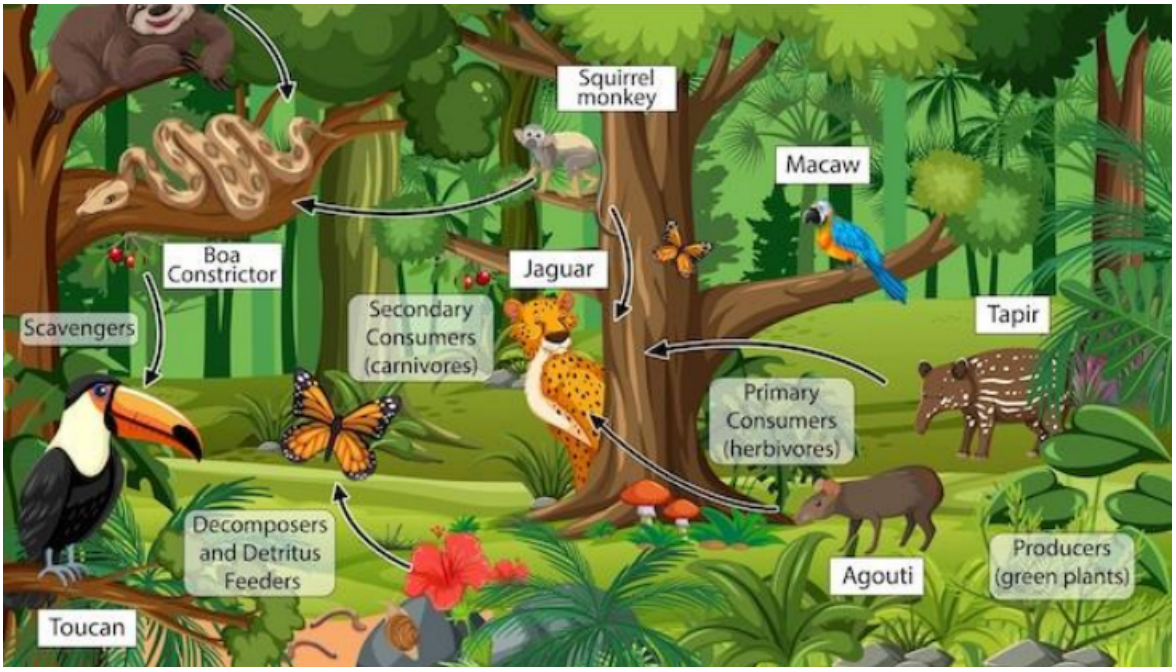
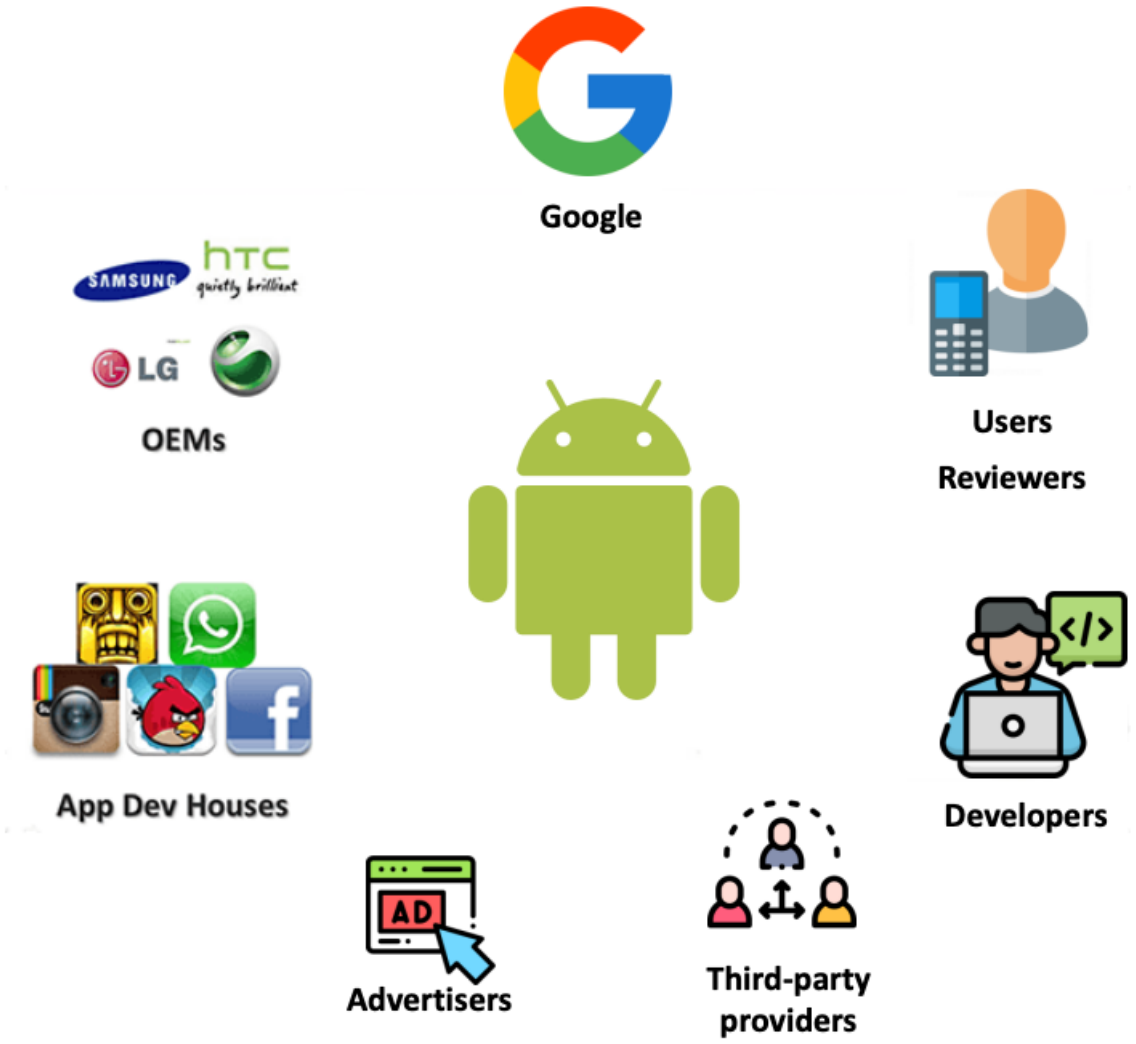
Examples:



- 

Android Ecosystem



1. Diversity of Participants:

- Google (platform owner)
- Developers & development orgs
- OEMs (device manufacturers)
- Users / Reviewers
- Third-party providers (ads, analytics, payments)

2. Interdependent Roles:

- **Google** manages Play Store, policies, resources
- **Developers** build apps, follow rules, update & support
- **OEMs** customize OS, pre-install apps, support hardware
- **Users** download apps, review, influence rankings
- **3rd Parties** offer tools & services (e.g., UI libs, QA tools)

3. Value Creation & Exchange:

- **Monetary**: revenue from apps, hardware, ads
- **Non-monetary**: services, data, personalization
- Platform enables innovation, interaction, and profit

4. Adaptability & Evolution:

- Mobile tech changes
- Security threats
- Regulatory shifts (e.g., GDPR)
- Market competition
- Privacy, transparency, and developer education

Summary: Ecosystem Characteristics

(from Thomas & Autio, 2020)

1. **Participant heterogeneity**
2. **Interdependence** (non-contractual)
3. **Ecosystem outputs**
4. **Adaptability & evolution**

Modularity

> **Definition** (Baldwin & Clark, 1997):
> Building complex systems from **independent but interoperable modules**

💻 Historical Example:

- **Old mainframes** (e.g., UNIVAC, IBM 700): rigid, incompatible systems
- **IBM System/360** (1960s):
  - Unified architecture
  - Interoperable models
  - Opened to 3rd party module development
  - Became standard and highly successful

Modularity in Practice:

- **Visible Design Rules**:
  1. **Architecture**: system blueprint (what modules exist)
  2. **Interfaces**: how modules connect (e.g., APIs)
  3. **Standards**: testing, measuring performance
- **Hidden Parameters**:
  - Allow internal innovation in modules
  - Don't disrupt system as a whole

🧩 Modularity in Digital Ecosystems

1. Platform Architecture:

- Modular software design = flexibility, upgradability, scalability

2. Ecosystem Design:

- Developers create add-ons via APIs
- Allows **customized extensions** (e.g., niche apps)

🌟 Outcomes:

- **Innovation** (e.g., constant app evolution)
- **Scalability** (e.g., Android across devices)
- **Resilience** (one module failure ≠ ecosystem failure)

🔬 Ecosystem Streams in Research

Ecosystem Type	Focus
Business	Firm and environment
Innovation	Specific value propositions or new tech
Platform	Technological bases and the actors surrounding them

(Shipilov & Gawer, 2020)

🔗 Platforms vs. Ecosystems

Platform Type	Description
One-sided	Single user group (e.g., early Facebook)
Multi-sided	Several groups (e.g., users + advertisers)
Hybrid	Merged functions (e.g., devs, users, business)
Ecosystem	Complex, evolving networks with distributed control

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📌 Final Summary

- Digital ecosystems = **dynamic constellations** of interdependent actors
- Defined by **diversity, modularity, value exchange**, and **evolution**
- Platforms are often part of ecosystems, but ecosystems go **beyond** platforms
- Modularity is a **core enabler** of scalability, innovation, and resilience