## **Summary of Different Project Methodologies**

Project management methodologies define how to structure, execute, and complete a project. The choice of methodology impacts project success, efficiency, and adaptability. Below are some widely used methodologies:

### **1. Waterfall Methodology**

* **Nature**: Linear and sequential.
* **Phases**: Requirement → Design → Implementation → Testing → Deployment → Maintenance.
* **Best For**: Projects with clearly defined requirements and minimal expected changes.
* **Advantages**: Simple, structured, and easy to manage.
* **Disadvantages**: Inflexible to changes once a phase is completed.

### **2. Agile Methodology**

* **Nature**: Iterative and incremental.
* **Principles**: Customer collaboration, responding to change, working software over documentation.
* **Frameworks**: Scrum, Kanban, Extreme Programming (XP).
* **Best For**: Projects with evolving requirements.
* **Advantages**: Flexibility, faster feedback, continuous improvement.
* **Disadvantages**: May lack predictability in budget and timeline.

### **3. Scrum Framework**

* **A Subset of Agile**: Uses sprints to deliver increments of work.
* **Roles**: Product Owner, Scrum Master, and Development Team.
* **Ceremonies**: Sprint Planning, Daily Stand-ups, Sprint Reviews, and Retrospectives.
* **Best For**: Small teams working on complex projects.

### **4. Kanban**

* **Nature**: Visual workflow management.
* **Focus**: Limiting work in progress (WIP), visualizing tasks using a Kanban board.
* **Best For**: Continuous delivery environments.
* **Advantages**: Simple, promotes continuous flow and improvements.

### **5. Lean**

* **Origin**: Based on Toyota’s manufacturing principles.
* **Focus**: Eliminating waste, maximizing customer value.
* **Best For**: Projects where efficiency is a top priority.
* **Advantages**: Fast delivery, minimal waste.

### **6. DevOps**

* **Combination**: Development + Operations.
* **Focus**: Automation, continuous integration (CI), continuous deployment (CD), collaboration between development and operations teams.
* **Advantages**: Faster delivery, better collaboration, enhanced product quality.

### **7. Spiral Model**

* **Nature**: Combines iterative nature of Agile and systematic aspects of Waterfall.
* **Phases**: Repeated cycles (spirals) consisting of planning, risk analysis, engineering, and evaluation.
* **Best For**: High-risk projects requiring frequent reassessment.

### **8. Hybrid Methodology**

* **Combination**: Mix of Waterfall and Agile.
* **Use Case**: When planning and predictability are required alongside flexibility.