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Agile software Development is a software development methodology that values flexibility collaboration and customer satisfaction.

Comparative Analysis of Agile Approaches:
Agile methodologies emphasize iterative development, team collaboration and continuous improvement of deliver high quality software

Scrum:
Framework: Scrum organizes work into fixed-length iterations called sprints. (usually 2-4 weeks)

Key Roles:

Scrum Master: Ensures the team adheres to scrum principles

Product Owner: Manages the product backlog and prioritizes task.

Development team: Cross functional group responsible for delivering increments.

Application:

1. Ideal for teams working on projects with evolving requirements.

2. Suited for small to medium-sized projects where collaboration and quick adjustments are crucial

Effectiveness:

→ cost : High efficiency reduces waste.

→ Time : Frequent deliverables ensure rapid value delivery.

→ Risks: Early detection of issues minimize long term risks.

Kanban:

Framework: Focous on visualizing workflow using a kanban board with columns nepnes-enting different work stage.

Key Principles:

→ Limit work in progress (WIP)

→ Manage flow by identifying bottlenecks

continously improve processes.

Flexibility:
→ No fixed iterations
→ Task move across the board as completed.

Effectiveness:
→ Low implementation cost
→ Optimized task flow improves productivity
→ Transparent workflow aids in early problem identificat

Extreme Programming (XP)

Framework: Focuses on engineering practice to improve software quality and responsiveness

Core Practices:
Test driven development (TDD)
Pair Programming
Continuous Integration and frequent releases

Application:
→ Effective for high risk projects requiring frequent changes
→ Ideal for small teams with close customer collaboration.

Effectiveness:
→ Automation of testing reduces long term cost
→ frequent releases ensure faster value delivery.

Subject / Theme :

Lean Development :

Framework : Derives from lean manufac-
turing ; focusing on eliminating waste,
amplifying learning and delivering value :

Principles :

Optimize whole process

Build quality

Deliver fast and defer commitment until necessary

Application :

1. Suitable for organizations seeking efficiency
in resource utilization.

2. works well for teams