

SE423 Software Project Management

Artifact 2: Methodology Analysis, Risks, and Decision

Scenario 11: National Employment and Skill Matching Platform

Group Members:

SHOUG FAWAZ ABDULLAH ALOMRAN

ROSE SAEED RAKAN AL RAKAN

YARA FARIS FAIHAN ALBUGAMI

HATOON ABDULLAH

Instructor: Ms. Alhanouf Almutairi

Section: 1480

1. Agile 1 (Scrum).....	3
1.1 Strengths & Weakness.....	3
1.2 Match with Team/Organizational Structure & Stakeholders.....	4
2. Agile 2 (XP).....	5
2.1 Strengths & Weakness.....	5
2.2 Match with Team/Organizational Structure & Stakeholders.....	6
3. Waterfall.....	7
3.1 Strengths & Weakness.....	7
3.2 Match with Team/Organizational Structure & Stakeholders.....	9
4. Incremental Model (Plan-Driven / Staged Delivery).....	10
4.1 Strengths & Weaknesses.....	11
4.2 Match with Team/Organizational Structure & Stakeholders.....	12
5. Selected Process Methodology.....	12
5.1 Discussion On Selected.....	12
5.2 Risk Register.....	13

1. Agile 1 (Scrum)

1.1 Strengths & Weakness

Strengths	
Improved team communication	Through the daily scrums, members are able to effectively communicate about what they did and their future plans. This way everyone is up to date on the current progress and any changes
Lightweight and adaptable plans	As Fursah is a new project, it's prone to risk-taking, experimentation, and volatility. Those in turn need teams that are adaptable and resilient. Scrum allows that with flexibility from agile planning by continuously updating based on feedback and changing requirements.
Emphasis on finishing work	Higher productivity and better quality is found due to scrums encouraging members to complete tasks instead of being stuck on multiple items concurrently.
Continuous improvement and rapid feedback	Fursah is something new that requires constant change due to its initial ambiguity, that's why regular retrospectives can help keep all members accountable and allow them to grow and improve. On that note, rapid feedback gives the ability to adjust work iteratively with better solutions. This allows the team to learn what went well, wrong, and what can be improved next time.

Weaknesses	
Assumes human perfection	Scrum, especially for Fursah, sounds like the perfect methodology. However, scrum assumes that all members are able to communicate effectively and can think for themselves. These are core personality features in scrum. It also relies on the fact that members are able to be adaptable, and willing to join meetings everyday.
Member	Due to the quick-paced nature of the scrum method, in practice,

Weaknesses	
burnout	members can be burnt out. This can be from the continuous work, meetings, and changes for improvement.
Replacement affect	Replacement of team members can affect the schedule as well, making it hard to deliver on time

1.2 Match with Team/Organizational Structure & Stakeholders

- **Team structure:** The principles of scrum directly correspond to our team structure, creativity. The creativity team was our choice due to Fursah being a new concept that required iterations and constant change. It is evident that scrum is a direct match with our team structure.
- **Organizational structure:** We chose matrix organization structure since it includes rapid response and it fits our dynamic environment that could be unstable. This matches the scrum method as it is basically built for handling change and responding quickly.
- **Stakeholders:** Scrum has product owner, scrum master, the developers, however stakeholders aren't necessarily members of the project directly. Stakeholders involvement usually happens at the end of each sprint, in the sprint review, to give feedback and talk about what to do next. They are also involved in the product backlog input, which is done with the product owner. It's where stakeholders share business needs, market insights, and any additional information.

2. Agile 2 (XP)

2.1 Strengths & Weakness

Strengths	
High software quality through continuous testing	XP emphasizes Test-Driven Development (TDD), in which developers write tests before implementing code. For Fursah, this can help verify CV parsing, matching-score calculations, job recommendations, and application workflows throughout development, rather than discovering defects only near the end.
Adaptability to changing requirements	XP supports short development cycles, frequent feedback, and continuous improvement. This is useful when the Ministry of Human Resources and Social Development (HRSD), employers, or job seekers identify improvements to matching criteria, Arabic and English CV processing, or portal usability during development.
Early detection of integration defects	XP encourages continuous integration, allowing developers to integrate and test code frequently. This can help identify compatibility issues between the Smart Matching Engine, Job Seeker Portal, and Employer Portal before they become more difficult to resolve.
Improved collaboration and shared knowledge	Pair programming and collective code ownership encourage developers to share knowledge and review each other's work. This is valuable for Fursah because the NLP-based matching engine and the two portals require coordinated development across different technical components.

Weaknesses	
Requires strong technical discipline	XP depends on consistent testing, refactoring, continuous integration, and coding standards. If team members lack

Weaknesses	
	experience with these practices, implementation may become inconsistent and software quality may suffer.
High initial testing effort	Creating automated tests, suitable test data, and evaluation procedures for CV parsing and matching accuracy requires time and effort. This may initially slow feature development, particularly for the NLP-based Smart Matching Engine.
Requires frequent stakeholder feedback	XP works best when a knowledgeable business representative is available to clarify requirements and provide timely feedback. If HRSD representatives or relevant users are unavailable, developers may make incorrect assumptions about matching rules or portal requirements.
Coordination challenges in a matrix organization	Pair programming and frequent collaboration require overlapping availability. Since team members may also have responsibilities to functional managers, competing assignments could interrupt pairing sessions and delay development.

2.2 Match with Team/Organizational Structure & Stakeholders

- Team Structure:** Fursah's creativity-oriented team benefits from XP's emphasis on experimentation, short development cycles, continuous testing, and frequent feedback. These practices allow developers to test different approaches to CV parsing and job matching and improve the implementation as they learn. However, the team must maintain strong technical discipline and follow agreed testing and coding standards for XP to be effective.
- Organizational Structure:** Fursah uses a matrix organizational structure, in which team members may have responsibilities to both project and functional managers. XP's continuous integration, shared code ownership, and frequent communication can improve coordination across the Smart Matching Engine and both portals. However,

pair programming and frequent collaboration may be difficult when team members have competing assignments. Project and functional managers should coordinate resource availability and protect time for essential development and testing activities.

- **Stakeholders:** HRSD can provide business priorities and clarify relevant requirements, while job seekers and employers can provide feedback on profile management, job postings, applications, and the usefulness of matching recommendations. Universities, training providers, technology firms, and relevant government stakeholders may contribute where their involvement is relevant to the agreed scope. XP can incorporate stakeholder feedback frequently, but timely participation is necessary.
- **Overall Suitability:** XP is a suitable Agile alternative for Fursah because it emphasizes software quality, early defect detection, collaboration, and adaptability, particularly important for the Smart Matching Engine and its integration with the two portals. Nevertheless, its success depends on the team's technical skills, disciplined testing practices, stakeholder availability, and coordination of shared resources. Compared with Scrum, which emphasizes sprint planning, team coordination, and regular reviews, XP places greater emphasis on engineering practices such as TDD, pair programming, continuous integration, and refactoring. The final choice should depend on which approach best fits the team's capabilities and project constraints.

3. Waterfall

3.1 Strengths & Weakness

Strengths	
Fully clear and documented requirements written and ready upfront.	Fursah is responsible for handling employment and personal data. By protecting the data we use the Personal Data Protection Law (PDPL) and it must be hosted in Saudi

Strengths	
Each phase ends with a formal document and approval before moving on to the next phase.	Arabia. Finalized design and requirements documents simplify the process to show regulators and HRSD the constraints are managed before starting any codes.
Well- defined schedule and budget. Cost, scope, and schedule are fixed early on, making it easier to track progress.	As a government- backed up national project, HRSD requires well- defined project costs and schedule estimations, to support budgeting and approval.
Effective oversight and accountability. Each phase includes approval gates, assigned responsibilities, and deliverables.	Fursah includes many stakeholders such as HRSD, government agencies, technology firms, and universities. Defined phase gates makes sure that each organization knows its responsibilities which ensures reduction of misunderstandings.
Suitable for well- defined and unchanging components.	Some parts of Fursah components are stable and well-defined. Such as managing profiles, job listings, and monitoring applications. These features can be done before development with low risks.

Weaknesses	
Extremely poor at handling and dealing with changing requirements. Once a phase is approved, it is difficult going back due to it being costly and time-consuming.	Fursah serves a job market that changes every so often, in addition to Vision 2030 labor policies are changing rapidly. Resulting in features such as job listings, analytics, and training suggestions may require changes during development which may be difficult to do with the Waterfall approach.
The software won't be able to be in use until later in the	Employers, job seekers, and HRSD could only provide at the final stages issues could arise such as the

Weaknesses	
project. Sponsors and users can't be able to see anything until testing is finished.	accuracy of job matching or the usability of language support for English/Arabic could be identified too late resulting in them being too expensive to fix later on.
Waterfall is risky for creative or unclear components.	The NLP- based Smart Matching Engine is a new feature that requires testing for accuracy with real data. Which is difficult and unsuitable for because we need the design to be finished before development begins.
Waterfall isn't suitable for phased rollout. The delivery of the whole system is at the end in the Waterfall approach.	According to Artifact 1, Fursah should follow a phased rollout [Core Platform —> Platform Expansion —> National Rollout] Pure Waterfall delivers the whole system in one go, at the end it would need adjustments to support the plan.

3.2 Match with Team/Organizational Structure & Stakeholders

- Team structure:** According to Artifact 1 the team was formed around the focus of creativity. Which indicates the team can handle iterations, ambiguity, and explore and try new ideas. Waterfall isn't a suitable match for this because it requires well-defined and clear requirements and it makes it difficult to go back to previous decisions. Which limits the teams ability to to explore new ideas when developing new features such as NPL- based personalized and job matching career guidance. A creative team using the Waterfall approach would require them to finalize their design decisions before testing and getting the chance to test if their ideas are effective.
- Organizational structure:** Fursah utilizes a matrix organization structure where team members report to both their functional department managers and project managers. Waterfall is partially suitable for this structure because fixed phases support departments' schedules when their employees are needed. Nevertheless, Artifact 1

adopted the matrix structure because it supports the team to reply to rapid shifts in the job market Waterfall's defined phases limit this flexibility.

- **Stakeholders:** HRSD and other government agencies gain from well defined deadlines, documentations, and approvals. Although employers, students, job seekers wouldn't be able to test and access the platform until the final steps, reducing the chances of feedback and suggestions to improve the platform. Training providers and universities would have limited opportunities to adjust their requirements after approval.

4. Incremental Model (Plan-Driven / Staged Delivery)

Overview

The Incremental Model is one that is plan-driven. All the requirements and architecture of the system are determined and approved during the initial phase of the project just as it is done in a predictive strategy. The work scope is broken down into a systematic series of increments. Each increment goes through the process of requirement analysis, design, implementation, testing, and gate phase review before delivery to the user. Successive increments supplement the previously delivered increments until the entire scope of the work is achieved. This is different from Waterfall (Plan-Driven 1) since the latter delivers the entire system to the user only once after it has been completed.

For Fursah, the increments follow the phased implementation defined in the project scenario:

- Increment 1: Core Smart Matching Engine (NLP), basic Job Seeker Portal, and basic Employer Portal (job postings, applications, candidate screening, interview scheduling).
- Increment 2: Career Guidance and Training Modules, and expansion of the platform to a wider range of industries.

- Increment 3: Data Analytics Dashboard for the Ministry, Professional Networking, full integration with other government services, and the national-level rollout.

4.1 Strengths & Weaknesses

Strengths	
Early Delivery of Core Value	The Smart Matching Engine and the basic Job Seeker and Employer Portals are delivered in the first increment. Users can start benefiting long before the full scope is complete, unlike in Waterfall.
Reducing technical risks at an early stage	The NLP matching engine is the riskiest element of the development process. Creation and verification help reveal issues that are associated with accuracy and parsing prior to embarking on development of other modules.
Predictability of scheduling and budgeting	Schedule and budget of each increment are defined in advance. The Ministry will be able to approve the budget and schedule and control them against baseline.
Control by phase-gate approach	At the end of each increment, there is a formal review performed by the Ministry that gives governmental control of the project necessary for data security and integration with government services.

Weaknesses	
Limited Flexibility	The requirements become locked in early in the process, hence any changes to the system, like screening criteria or policies from the Ministry, have to go through change control.
Dependence on Up-front Design	If the up-front design doesn't account for future requirements like national data and the dashboard, components that had already been delivered will require redesigning.
Increasing Integration Work	Every additional increment has to be integrated and regression tested against all previous increments, including government systems, so this work becomes increasing as time goes by.

Weaknesses	
Only Feedback at Increment Boundaries	The stakeholders provide feedback only upon delivery of an increment, hence usability problems might not be discovered until then.

4.2 Match with Team/Organizational Structure & Stakeholders

Team Structure: Fursah’s creative team can experiment with NLP techniques within each increment, and lessons from one increment can shape the next. But the scope and architecture are already predefined and therefore offer limited flexibility. It is more suitable for the creative team compared to Waterfall but not compared to Agile.

Organizational Structure: Fursah’s matrix structure has increments that make it easy for functional managers to understand when their members will be required (e.g., NLP specialists in Increment 1), thus avoiding any resource conflicts. But change management can delay rapid responses which were the reason for using a matrix structure.

Stakeholders: Ministry of Education has predictable milestones and approvals. Job seekers and employers use the basic product and their inputs define later increments.

Overall Suitability: The Incremental Model suits Fursah better than Waterfall. It combines plan-driven control with early delivery and early risk reduction, and it matches the scenario’s phased implementation. However, its fixed upfront plan still limits the flexibility needed by Fursah’s creative team and its changing stakeholder needs.

5. Selected Process Methodology

After looking over the different methodologies and their respective risks, we have landed on choosing Scrum.

5.1 Discussion On Selected

Knowing our project is a new idea that comes with risk-taking, experimentation, and iterations, we felt it was most fitting. We also strayed away from any predictive methods

since Fursah doesn't technically have requirements that are well-defined at the start. On that note, our final choice was between either of the adaptive approaches. In the end, we chose scrum since it responds quickly to customer needs. Other reasons why we ended up choosing scrum is the overall ease of change and the scope's instability.

5.2 Risk Register

 SE423 Artifact 2 (Risk Register)