Assignment Guidance and Front Sheet

This front sheet for assignments is designed to contain the brief, the submission instructions, and the actual student submission for any WMG assignment. As a result the sheet is completed by several people over time, and is therefore split up into sections explaining who completes what information and when. Yellow highlighted text indicates examples or further explanation of what is requested, and the highlight and instructions should be removed as you populate 'your' section.

To be completed by the student(s) prior to final submission:

Your actual submission should be written at the end of this cover sheet file, or attached with the cover sheet at the front if drafted in a separate file, program or application.

Student ID or IDs for group work	**e.g. 1234567**

To be completed (highlighted parts only) by the programme administration after approval and prior to issuing of the assessment; to be consulted by the student(s) so that you know how and when to submit:

Date set	19/5/2025
Submission date (excluding extensions)	16th June 2025 by 12pm UK time
Submission guidance	To be submitted electronically via Tabula
Late submission policy	If work is submitted late, penalties will be applied at the rate of **5 marks per University working day** after the due date, up to a **maximum of 10 working days** late. After this period the mark for the work will be reduced to 0 (which is the maximum penalty). "Late" means **after the submission deadline time as well as the date** – work submitted after the given time even on the same day is counted as 1 day late. For **Postgraduate** students only, who started their **current course before 1 August 2019**, the daily penalty is **3 marks** rather than 5.
Resubmission policy	If you fail this assignment or module, please be aware that the University allows students to remedy such failure (within certain limits). Decisions to authorise such resubmissions are made by Exam Boards. Normally these will be issued at specific times of the year, depending on your programme of study. More information can be found from your programme office if you are concerned.

To be completed by the module owner/tutor prior to approval and issuing of the assessment; to be consulted by the student(s) so that you understand the assignment brief, its context within the module, and any specific criteria and advice from the tutor:

Module title & code	WM9G3-15 Project Management in Practice: Applications and Implementation
Module owner	Lydia Adigun
Module tutor	Lydia Adigun & David Pontin
Module marker	Lydia Adigun & David Pontin
Assessment type	Report
Weighting of mark	80% Assessment

Assessment brief

Actual assessment: question/task etc
Overall
Answer the following PMA question:

Question1 : How would you apply a suitable project management methodology to successfully deliver project objectives? 70%

To answer this question, choose a project either known to yourself personally which you have been involved in or where information is available through an Industrial visit/ virtual tour. (2000-2250 words)

1. Analyse what project management methodologies have been used along with the level of project management maturity within the organisation (with reference to a project management maturity model) (20 marks)

2. Critically evaluate the effectiveness of these approaches identifying (with justification) the main issues, problems, or areas for improvement. (20 marks)

3. Suggest solutions and recommendations based on best practices in the application of project management in practice and novel approaches from current research. (20marks)

Question 2: Write a critical reflection based on the virtual tour or industrial visit(s), or visits of Project Management Professionals. In this reflection, analyse and pinpoint the specific areas or themes that are considered crucial by contemporary project management experts for achieving successful project delivery and implementation. (750-1000 words) 30 marks.

Word count	*The word count limit for this assignment is 3200 (+/- 200) words. Additional words that exceed these tolerances may not be marked.*
Module learning outcomes (numbered)	*ILO1: Critically appraise how projects are managed in practice, so as to develop a comprehensive understanding of a variety of Project Management methodologies and approaches* *ILO 2: Evaluate critically current research and advanced scholarship in order to identify key factors for consideration in the selection of Project Management methodologies and approaches across a range of practice settings*

<table>
<tr><td></td><td>ILO3: Reflect on current problems and challenges in the application of Project Management in practice, and with reference to research and practice, consider and develop novel approaches and/or solutions
ILO4: Consider complex issues both systematically and creatively through comparison and contrast of Project Management methodologies and approaches across a range of practice settings, and thereby suggest areas for improvement</td></tr>
<tr><td>Learning outcomes assessed in this assessment (numbered)</td><td>ILO1, ILO2, ILO3, ILO4</td></tr>
<tr><td>Marking guidelines</td><td>
<table>
<tr><th>Criteria</th><th>Exceptional (90-100%)</th><th>Excellent (80-89%)</th><th>Very Good (70-79%)</th><th>Good (60-69%)</th><th>Satisfactory (50-59%)</th><th>Pass (40-49%)</th><th>Marginal Fail (30-39%)</th><th>Fail (0-3%)</th></tr>
<tr><td>Critical Comprehension & Analysis</td><td>Demonstrates exceptional comprehension and critical analysis with highly original insights and thorough evaluation of evidence.</td><td>Shows excellent comprehension and critical analysis with original insights. Evaluates evidence thoroughly.</td><td>Demonstrates very good comprehension and critical analysis with some original insights.</td><td>Shows good comprehension and critical analysis with minor gaps. Evaluates evidence competently.</td><td>Demonstrates adequate comprehension and analysis. Evaluates evidence with some limitations.</td><td>Shows basic comprehension with minimal analysis. Limited evaluation of evidence.</td><td>Lacks comprehension and critical analysis. Poor evaluation of evidence.</td><td>Fails to demonstrate comprehension or critical analysis. No evaluation of evidence.</td></tr>
<tr><td>Research and Evidence</td><td>Utilizes an extensive range of high-quality academic sources. Demonstrates outstanding research skills and integrates evidence seamlessly.</td><td>Uses a wide range of relevant academic sources. Demonstrates excellent research skills and integrates evidence well.</td><td>Uses a good range of relevant academic sources. Demonstrates very good research skills and integrates evidence effectively.</td><td>Uses a satisfactory range of sources. Demonstrates good research skills and integrates evidence adequately.</td><td>Relies on a basic range of sources. Shows adequate research skills and some integration of evidence.</td><td>Uses limited or less relevant sources. Basic research skills and minimal integration of evidence.</td><td>Inadequate use of sources. Poor research skills and little to no integration of evidence.</td><td>Fails to use academic sources appropriately. Lacks research skills and evidence integration.</td></tr>
<tr><td>Cohesion, Structure, and Grammar</td><td>Exceptionally well-organized, cohesive, and structured. Clear, logical flow with excellent grammar and style. Core themes and discussion points are clearly evident.</td><td>Well-organized and structured. Clear flow with minor errors in grammar or style. Core themes and discussion points are mostly evident.</td><td>Adequately organized with some logical structure. May have minor inconsistencies and errors in grammar or style. Core themes are somewhat evident.</td><td>Basic organization and structure. Some sections may lack clarity or logical flow. Noticeable errors in grammar or style. Core themes are minimally evident.</td><td>Poorly organized and structured. Lacks clarity and logical flow. Significant errors in grammar or style. Core themes are not evident.</td><td>Disorganized and lacks coherence. Major errors in grammar and style. Core themes are unclear.</td><td>Severely disorganized and incoherent. Numerous errors in grammar and style. Core themes are absent.</td><td></td></tr>
<tr><td>Effort and Presentation</td><td>Demonstrates exceptional effort and a high level of professionalism in presentation. Clear, visually appealing, and engaging.</td><td>Shows excellent effort and presentation with minor areas for improvement. Clear and mostly engaging.</td><td>Demonstrates very good effort and presentation with some areas for improvement. Generally clear and engaging.</td><td>Shows good effort and presentation with minor areas for improvement. Clear and mostly engaging.</td><td>Adequate effort and presentation with some areas for improvement. Generally clear but may lack engagement.</td><td>Basic effort and presentation with noticeable areas for improvement. Some parts may lack clarity or engagement.</td><td>Poor effort and presentation. Lacks clarity, visual appeal, and engagement.</td><td>Very poor effort and presentation. No clarity, visual appeal, or engagement.</td></tr>
<tr><td>Adherence to Guidelines</td><td>Fully adheres to all assignment guidelines and exceeds expectations.</td><td>Adheres to guidelines with minor deviations.</td><td>Mostly adheres to guidelines with some deviations.</td><td>Partially adheres to guidelines with noticeable deviations.</td><td>Fails to adhere to assignment guidelines.</td><td>Fails to adhere to assignment guidelines.</td><td>Fails to adhere to assignment guidelines.</td><td>Fails to adhere to assignment guidelines.</td></tr>
</table>
</td></tr>
<tr><td>Academic guidance resources</td><td>Where further help may be received, link to handbook, details of feed forward, workshops, seminars etc</td></tr>
</table>

The following is pre-populated for PGT assignments only:

Writing your Post-Module Assignment (PMA): specific additional advice for WMG's Postgraduate Taught Students

As a postgraduate level student in WMG you may have some concerns about your ability to write at the high standard required. This short guide is intended to provide general guidance and advice. It is important that if you have any questions, you discuss them with your module tutor. Remember, in writing your PMA you need to meet the expectations of the reader and university.

A good PMA generally requires you to answer the question and to include…

1. A title, with your student number, module, lecturer's name and any other documentation required by the university.
2. A contents page and if appropriate, an abstract.
3. An introduction which acts as a 'map' to the rest of the document, describing the aim or purpose of the work and explaining how this aim is achieved. At this point it is usually helpful to paraphrase your conclusion.
4. Evidence of an appropriate level of background reading of relevant texts.
5. Evidence of systematic and clear thinking, indicative of good planning and organisation.
6. Writing which makes sense, is clearly and carefully presented (proof-read and grammar checked).
7. A critical style of writing which compares and contrasts the main theories, concepts and arguments with conclusions that are based in evidence presented.
8. High levels of accurate academic referencing.
9. A logical and well-defined structure with headings and subheadings.
10. Clearly labelled and well-presented diagrams and other graphics that are discussed in the text.
11. Adherence to usual academic standards including length and a timely submission.
12. A reference section in which every source that is cited in the text is listed.

Where to get help:

1. **Talk to your module tutor if you don't understand the question or are unsure as to exactly what is required.**
2. The university Academic Writing centre provides workshops and useful tools to help you in all aspects of your work. https://warwick.ac.uk/services/skills/academicwriting/
3. Avoiding Plagiarism, the university's site to help you to reference properly https://moodle.warwick.ac.uk/course/view.php?id=42224
4. Wellbeing support services https://warwick.ac.uk/services/wss
5. Numerous online courses provided by the University library to help in academic referencing, writing, avoiding plagiarism and a number of other useful resources. https://warwick.ac.uk/services/library/students/your-library-online/

1. INTRODUCTION

Back in the early 2000s, the Federal Bureau of Investigation (FBI) realized its old case management systems just weren't cutting it anymore especially after the 9/11 attacks exposed some serious issues with data sharing and intelligence analysis (U.S. Department of Justice, Office of the Inspector General, 2006). To fix this, they kicked off the Trilogy programme, which included something called the Virtual Case File (VCF), aimed at modernizing things. But VCF ended up failing mainly because of poor planning, going over budget, and constant delays (GAO, 2008; Dube, 2015).

To move forward, the FBI launched the Sentinel project in 2005. This one was meant to finally deliver a proper digital case management system that could actually help teams collaborate better across the board. They used commercial off-the-shelf tools and built it on a service-oriented architecture (Zemer, 2013). The whole idea was to back the FBI's transformation efforts by improving access to info and making everything more connected. This report looks at the project management methods used in Sentinel, assesses its maturity level, and points out a few areas where things could've gone better.

2. PROJECT OVERVIEW

The Sentinel project kicked off in 2005 when the FBI set out to completely revamp its aging case management systems and move toward secure, digital investigative processes across the bureau. The main goal was to replace the old Automated Case Support (ACS) system with something modern that could handle everything from documentation and evidence tracking to lead management and reporting while also making it way easier to share data within the FBI and with outside agencies (GAO, 2008).

The project was broken down into four phases, each adding new features like browser-based access, document and record management, enterprise-wide search, and finally, retiring the old ACS system. A flowchart below shows how these stages were rolled out (U.S. Department of Justice, Office of the Inspector General, 2006).

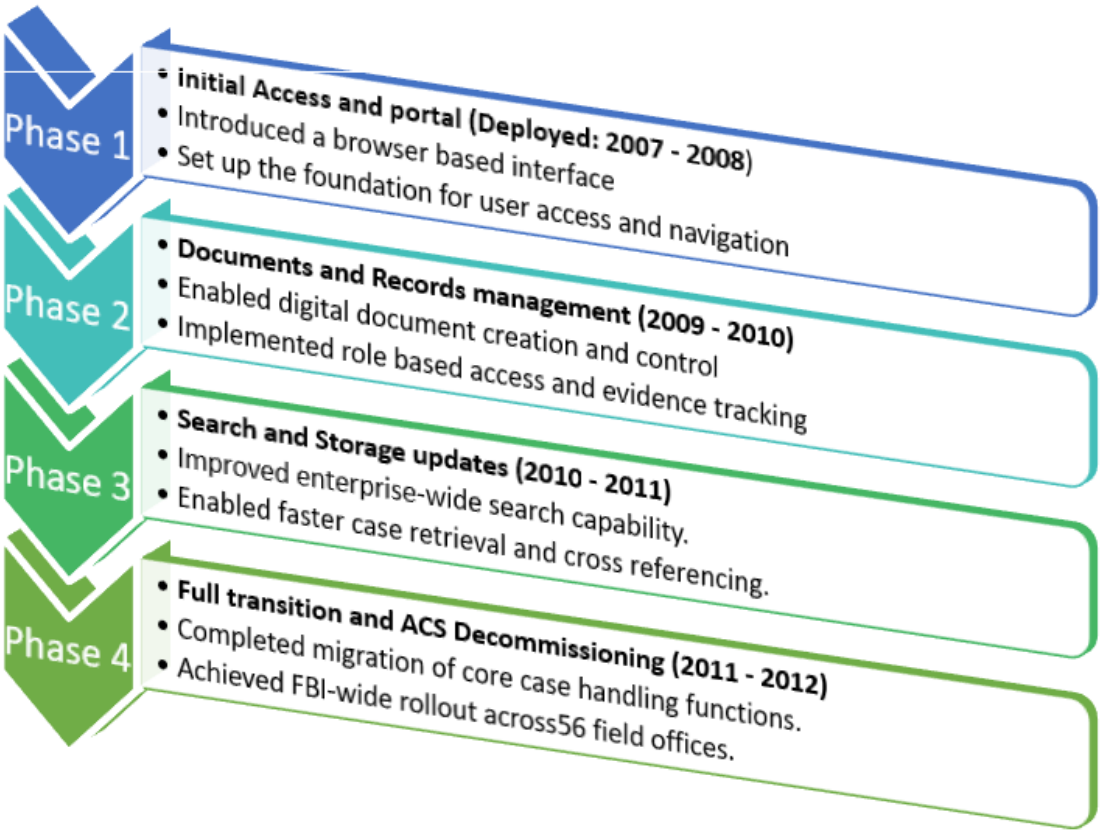

Figure 1: Phased Implementation Timeline of the FBI Sentinel Project (2007–2012)

Sentinel's reach covered all 56 FBI field offices and supported over 30,000 users across the country (Dube, 2015). It was built to respond to growing national security needs, especially with inter-agency cooperation becoming critical after 9/11. The system ended up playing a big role in improving how investigative data was captured, searched, and analyzed (Dube, 2015).

Key stakeholders included top FBI leadership (Director, Deputy Director, CIO), the Sentinel Program Office, and Congress, which handled the funding and oversight. The Department of Justice (DOJ) and its Office of the Inspector General (OIG) were regularly reviewing how things were going. Lockheed Martin started out as the main contractor, though later on, the FBI took more control of the work itself (Wernham, 2012).

A timeline below shows the big milestones from the start of the project to its full rollout.

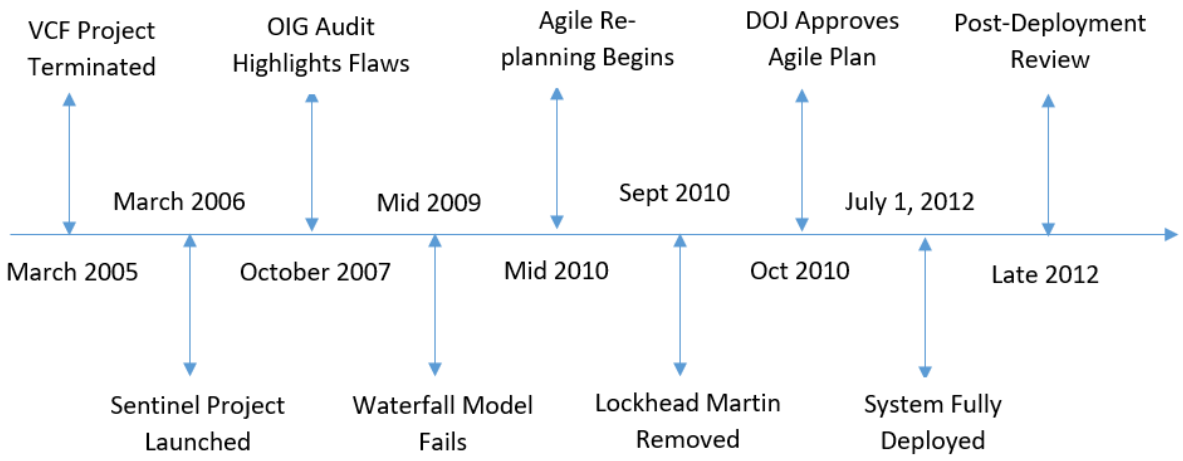

Figure 2: Timeline of Key Events in the FBI Sentinel Project (2005–2012)

3. PROJECT MANAGEMENT METHODOLOGIES USED IN THE SENTINEL PROJECT

Between 2006 and 2009, the Sentinel project followed a plan-driven, contractor-led model that pretty much resembled the Waterfall approach. Lockheed Martin delivered the work in step-by-step phases, but all the rigid paperwork, lack of flexibility, and limited FBI user input led to growing issues (U.S. DOJ, 2007; GAO, 2008). The cost-plus contract didn't help either it pushed risk back to the government, so there wasn't much incentive to stay efficient.

Even though tools like earned value tracking and milestone reviews were used, they felt more like box-ticking exercises than anything adaptive. Feedback loops were slow, and the process just didn't match the fast-moving nature of national security work (DOJ OIG, 2010; Grassley, 2012).

By late 2010, under a lot of outside pressure, the FBI changed direction and adopted Agile–Scrum under CIO Chad Fulgham (GAO, 2008). This meant moving away from contractors and building in-house teams, focusing on short sprints and actual user feedback (Strategic Discipline, 2013). It helped make progress more visible and improved how fast teams reacted to issues. But Agile wasn't perfect either. Some

features got dropped, and there were still financial uncertainties (InformationWeek, 2012). The shift worked because of leadership urgency and the need to rebuild trust not just the method itself. Figure 3 below shows the key differences between the Waterfall and Agile phases and highlights what really drove the transition.

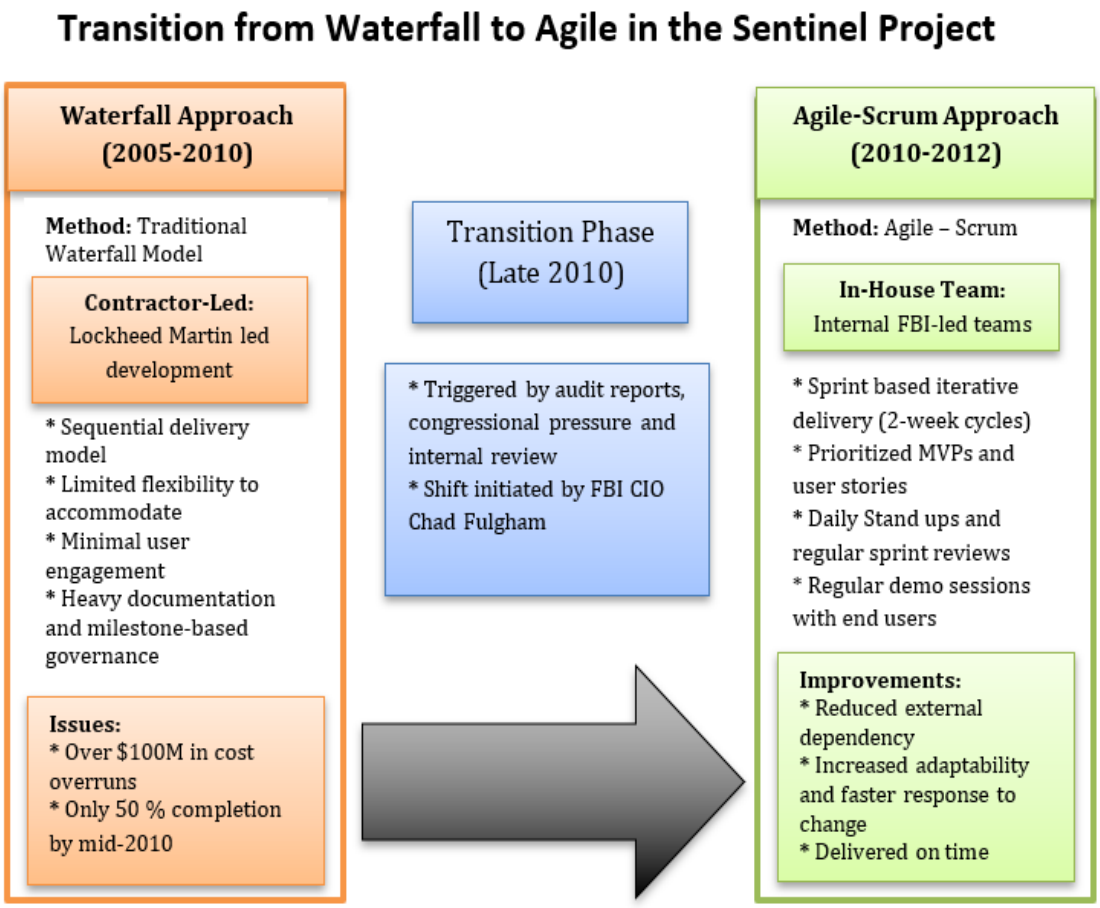

Figure 3: Transition from Waterfall to Agile-Scrum in the FBI Sentinel Project

4. PROJECT MANAGEMENT MATURITY ASSESSMENT (CMMI-BASED ANALYSIS)

While the FBI didn't formally adopt the Capability Maturity Model Integration (CMMI), it still provides a useful way to assess how the Sentinel project evolved over time. Between 2006 and 2009, the FBI's approach showed signs of Level 1 (Initial) and early Level 2 (Managed) maturity processes were mostly reactive, contractor-led, and lacked

standardisation. The Figure 5 below breaks this down clearly: the left side shows general characteristics at each CMMI level, while the right side connects those to what actually happened in the Sentinel project. For example, while milestone tracking and pilot testing were introduced in response to audits, they weren't well integrated across functions, which meant they felt more like compliance steps than true project control (GAO, 2008; U.S.DOJ,2007).

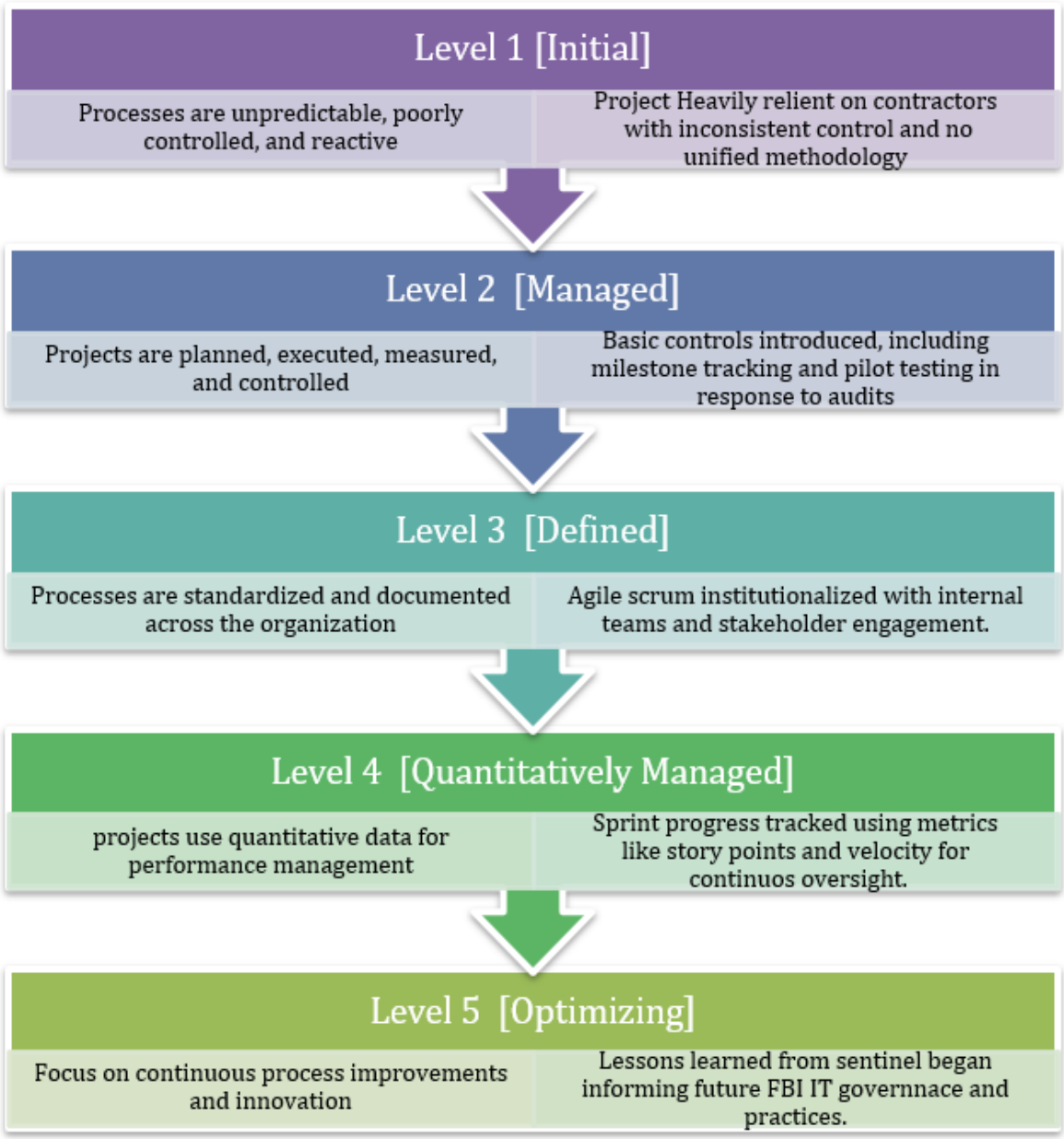

Figure 5: Application of the CMMI Maturity Model in FBI Sentinel Project Context

Things started to shift in 2010 with the move to Agile–Scrum. This helped push the project toward Level 3 (Defined), thanks to regular sprint reviews, retrospectives, and tighter user feedback loops (Wernham, 2012; Strategic Discipline, 2013). FBI teams gained more control, relying less on contractors and focusing more on actual results. But even with that progress, the maturity gains mostly stayed within the project. Bigger issues like inconsistent budgets and weak tracking across commitments hinted at gaps at the institutional level.

Overall, Sentinel shows a clear shift in how the FBI managed projects: moving from rigid, outsourced methods to something more flexible and responsive. But it also proves that adopting a new method isn't enough real success came from leadership changes, internal control, and the willingness to adapt. Broader maturity, though, still had a long way to go.

5. CRITICAL EVALUATION OF METHODOLOGIES AND KEY ISSUES

5.1 Overview of Methodological Transition

After the early issues described in the above section, the FBI shifted from a traditional Waterfall model to an Agile–Scrum approach in 2010. This wasn't just about switching frameworks it was a response to ongoing cost overruns, delays, and user dissatisfaction. The move signaled a change not only in how development was done, but also in how teams were structured, decisions were made, and who really owned the process. It laid the foundation for a more flexible, user-focused way of working.

5.2 Evaluation of Waterfall Implementation (2006–2009)

The FBI's initial run with Waterfall didn't go so well. Lockheed Martin, as the lead contractor, worked off a rigid, fixed plan that left little room for changes (Wernham, 2013). User input was mostly missing until the end stages, which meant usability problems came up too late (Olszewski & Wingreen, 2011). For instance, Phase 1 delivered a web interface, but agents rejected it, it just didn't do what they needed (DOJ OIG, 2012). This really showed how out of sync the teams and stakeholders were.

Even though later phases were broken into segments to speed things up, basic issues with scope and oversight stuck around. Segment 4 of Phase 2 was approved on paper but

never actually got deployed it didn't perform well and users didn't want it (DOJ OIG, 2012). Oversight didn't catch this in time, showing QA wasn't working properly. Code reviews also flagged problems with engineering standards (MITRE, in Olszewski & Wingreen, 2011).

At this stage, the FBI was roughly at CMMI Level 2 processes were somewhat repeatable but not consistent across teams (CMMI Institute, 2010). Combined with contractor reliance and patchy documentation, this really limited how fast they could adapt.

5.3 Evaluation of Agile–Scrum Implementation (2010–2012)

The Agile–Scrum phase brought major improvements. Sentinel was rebuilt around smaller, cross-functional teams, working in two-week sprints with clear deliverables (InformationWeek, 2011). User stories replaced bulky requirement docs, making priorities clearer and easier to manage. Most importantly, FBI agents were involved throughout giving direct feedback at the end of each sprint, which really helped shape the system to match real-world needs (Wernham, 2013).

With Fulgham leading, the FBI focused on building its own capabilities. Contractors took a back seat, while the Bureau took full control of the backlog and sprint planning. Tools like automated testing and continuous integration helped keep things on track. By July 2012, Sentinel was fully rolled out across the Bureau, with all major features in place and staying within the revised budget (DOJ OIG, 2012).

Process maturity improved too. Agile helped push the team toward CMMI Level 3—where workflows were defined and more consistent across teams (CMMI Institute, 2010). Documentation wasn't as strong as in Waterfall, but overall fit with user needs and stakeholder satisfaction went up a lot.

5.4 Cross-Phase Synthesis: Systemic Issues & Interdependencies

The Sentinel's turnaround wasn't just about Agile; it was also about how the organization evolved. The project started closer to CMMI Level 1 or 2, with patchy management, unclear roles, and weak stakeholder links (CMMI Product Team, 2010). Agile brought more structure and team responsibility, moving things toward Level 3 maturity.

Still, it wasn't all smooth. Old habits from Waterfall stuck around, and Agile practices didn't spread deeply enough across the whole org. Gaps in documentation, risk handling, and performance metrics stayed visible, showing that success relied heavily on the broader context, not just the framework used. Without matching growth in maturity, Agile's impact had limits (Kerzner, 2018).

5.5 Summary of Key Issues Identified

The FBI's original method made it hard to adapt, sidelined users, and failed to deliver what was needed. Agile fixed much of that, it sped up delivery, improved user satisfaction, and helped the team build real in-house capability. But that success didn't just come from changing the method—it needed a real shift in mindset, culture, and maturity to stick.

6. BEST PRACTICE-BASED RECOMMENDATIONS

The Sentinel case shows that the FBI needs more than just fixing procedures, it needs to think more deeply about how to apply the right project management practices in a way that suits its environment. Not every best practice will work as it is, some need adapting to fit the realities of public-sector work. This section highlights four key improvements that are supported by evidence and tailored to the FBI's specific challenges.

6.1 Reengineer Governance and Oversight

One of the main reasons for the failure of Trilogy and early Sentinel was the lack of clear accountability and weak oversight (GAO, 2008). Traditional stage-gate models can help by adding structure and reducing risk ,but they can also slow things down, especially in fast-moving areas like national security IT (Kerzner, 2018). A more flexible approach like combining stage gates with Lean Portfolio Management (LPM) could help balance control with adaptability. LPM allows changes to be made based on real value and not just rigid plans (Flinn, 2019).

However, its decentralized decision-making style may not go well with the FBI's top-down structure. To make it work, leadership would need support and training in more adaptive styles of governance. This is because senior leaders are often used to making

decisions through strict controls and formal procedures, so shifting to a more flexible, value-driven approach requires a change in mindset and working style.

6.2 Deepen Stakeholder Integration Through Systems Thinking

The success of Sentinel's later stages was largely due to involving end-users directly in development (GAO, 2008). However, earlier phases failed to engage stakeholders in a meaningful way interactions were limited and disconnected. While APM (2019) encourages stakeholder mapping, it doesn't fully address how different groups affect one another. A systems-thinking approach helps by viewing stakeholders as part of a wider network, where each group's actions can impact others (Kerzner, 2018).

For example, field agents and cybersecurity teams may have different priorities, so their needs must be balanced using tools like requirement traceability and shared review boards. Techniques from design thinking such as empathy maps and journey models can also help uncover user needs that aren't immediately obvious, though they need to be used carefully in sensitive government environments where data security is a concern (Kerzner, 2018).

6.3 Advance Organizational Maturity Beyond Compliance

In the early stages of Trilogy and Sentinel, the FBI had low project maturity. Work was unstructured and depended too much on individuals (Carnegie Mellon University, 2010). Using the CMMI model to reach Level 3 would bring more consistent practices across departments. But simply following the model isn't enough—maturity should be measured by real performance, such as fewer errors or faster delivery (CMMI Institute, 2010).

One way to support this shift is by adopting DevSecOps, which brings developers, security staff, and operations teams into one shared workflow to improve both speed and safety (Flinn, 2019). This creates a culture of joint responsibility across teams. For the FBI, adopting DevSecOps would mean tackling internal silos and clearance rules, which could be addressed by starting with small cross-functional pilot teams and support from experienced internal coaches.

6.4 Scale Agile Without Diluting Accountability

While Agile helped improve software delivery in Sentinel's later phases, many broader issues remained unresolved such as bottlenecks across departments, unclear ownership, and slow adoption outside of IT (GAO, 2008; Interim Report, 2010). Agile was applied only within development teams, while areas like procurement, compliance, and operations continued using traditional processes, leading to delivery delays and coordination breakdowns. Scaling Agile across the organisation requires not just new frameworks but a shift in mindset. Structured models like SAFe or PM^2-Agile can help coordinate large teams, but they must be adapted carefully to avoid unnecessary complexity (University of Canterbury, 2018).

There's also a risk that shared accountability can blur roles, especially in the FBI's top-down culture. To manage this, the FBI can introduce small agile teams within selected directorates (University of Canterbury, 2018). These teams would pilot scaled-agile practices in controlled environments, with a focus on retaining clear accountability. Insights from these pilots can feed into a wider Agile playbook for the agency, supporting an incremental shift from rigid, control-driven delivery to more responsive and collaborative project environments.