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Digital Insights:

Automation with Artificial Intelligence. Practical Proposal to Automate Operational Excellence Innovation Process

By: Mohammed F. Al-Haddad

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ABSTRACT

This paper explores the transformative impact of automation in project management, with a focus on Saudi Aramco's Operational Excellence (OE) process 12.1. by leveraging AI and automation technologies, organizations can reduce manual efforts, enhance data accuracy, and scale process efficiently. The study presents a pilot implementation proposal to automate OE process 12.1, illustrating how automation streamlines idea submission, evaluation, and execution workflows. A detailed comparison of manual and automated approaches highlights improvements in efficiency, scalability, engagement, and decision-making. This paper advocates for broader adoption of AI-powered automation as a strategic enabler for operational excellence, productivity, and innovation in project environments.

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I. INTRODUCTION

Automation in project management leverages advanced technologies to streamline and optimize routine tasks, transforming how teams plan, execute and monitor projects. By automating repetitive and time-consuming process such as task assignment, scheduling, reporting and resource allocation, organizations can reduce manual efforts, minimize errors and enhance overall productivity. This shift allows teams to dedicate more time to strategic decision-making, innovation and value-driven initiatives.

Automation tools improve consistency and real-time insight into project progress, resource usage, and potential progress bottlenecks. Features such as AI-driven forecasting and automated alerts enable project managers to proactively mitigate risk and dynamically adjust plans [1]. Furthermore, automation enhances scalability, allowing businesses to manage multiple project efficiently without sacrificing quality.

As industries embrace digital transformation, automation is becoming a cornerstone of modern project management, helping organizations achieve faster projects delivery times, increase cost efficiency and higher quality outcomes [2]. Ultimately, automation empowers teams to work smarter, adapt to changing demands and drive sustainable success in an increasingly competitive industry.

Concept of Implementing Automation in Projects 1 Figure

Figure 1 illustrates an innovative automation use case, where drones capture real-time construction progress updates. These updates are then analyzed by AI to generate progress reports, initiate letters and workflows or recommends areas of improvement. This forward-looking approach could redefine project management practices at Saudi Aramco.

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II. KEY ADVANTAGES AND ORGANIZATIONAL IMPACT

Automation is revolutionizing project management by empowering teams to work faster, smarter, and more accurately. It eliminates redundant work and optimizes workflows, allowing project leaders to focus on innovation, stakeholder alignment, and strategic goals.

THE TRANSFORMATIVE IMPACT OF AUTOMATION

Elevated Efficiency and Productivity

- Automation Accelerates workflows by managing assignments, tracking deadlines, and generating reports. For instance, AI tools can reduce manual efforts by up to [3] %30, enabling teams to focus on value added initiatives.

Minimizing Administrative Overhead

- Administrative tasks, data entry, status updates, consume %30-20 of a project manager's time Automation tools can generate dashboards, send automated updates, and take meeting notes, easing cognitive load [4].

Quality Assurance and Compliance Management

- AI quality assurance and automated compliance to Company standards and procedures ensures consistent outputs, reducing potential human errors [5].

Extended Strategic Benefits

Scalability and Predictability: Automation allows teams to manage multiple projects simultaneously without compromising quality. For example, a marketing team can automate campaign launches across regions, adjusting timeline dynamically based on real-time data.
Data-Driven Decision-Making: AI-powered tools analyze historical data to predict risks, estimate timelines, and allocate resources. This enables proactive adjustments, such as reallocating budget to high-priority tasks or projects.

Enhanced Client Satisfaction: Automated client portals provide stakeholders with instant access to progress reports, milestone updates and feedback loops, boosting transparency and trust.
Cost Optimization: by reducing manual labor cost and minizine errors, automation cuts operations costs by [6] %25-15 while accelerating timeframe of project completion.

III. PROPOSAL FOR AUTOMATING INNOVATION 12.1 OPERATIONAL EXCELLENCE AT SAUDI ARAMCO.

A.Problem Definition

The pursuit of Operational Excellence in temporary organization, such as Project Management, poses significant resource and time allocation challenges. The implementation of Operational Excellence processes can be particularly daunting for project team members, who are already fully engaged in executing project deliverables. Typically, these processes are assigned to project leads, who must balance these additional responsibilities with their existing workload, potentially leading to increased stress levels and decreased focus on core project objectives.

The Operational Excellence implementation framework is comprised of twelve primary process where some contain multiple sub-processes. To facilitate effective implementation, a comprehensive manual is dedicated to each process, typically spanning in total to around hundred and eighty pages. These manuals provide detailed guidance on the planning stage, execution steps, Key Performance Indicators (KPIs) and monitoring and necessary modification and adjustments for continuous improvement. Notably, the successful implementation of each process generally necessitates the involvement of multidisciplinary team, including a process owner, a champion, subject matter experts, and division coordinators. This underscores the complexity and resource intensity of these processes, highlighting the significant demands they place on Saudi Aramco departments.

B. AI Automation Proposal for OE 12.1 Innovation

The implementation proposal will focus on Operational Excellence process Innovation 12.1 as a pilot example to demonstrate automation principles applicable to broader process optimization. The Operational Excellence innovation process relies on close coordination, data collection, and report generation to drive efficiency of implementation. As depicted in Figure 2 , the current manual workflow for tracking innovation idea submission begins with the development of an innovation program by the Process Champion and Subject Matter Experts (SMEs). This program undergoes iterative review and approval by the Process Owner before advancing to execution.

A resource-intensive phase follows, requiring significant manpower to compile innovation submission rate reports by divisions, which SMEs then share with division coordinators. These coordinators collaborate with peers to foster participation, while the Process Champion and SMEs periodically assess progress against quarterly targets. Reports are regenerated as needed to reflect updated participation metrics, and then the cycle repeats until targets are met, after which the process recommences at the start of each new quarter.

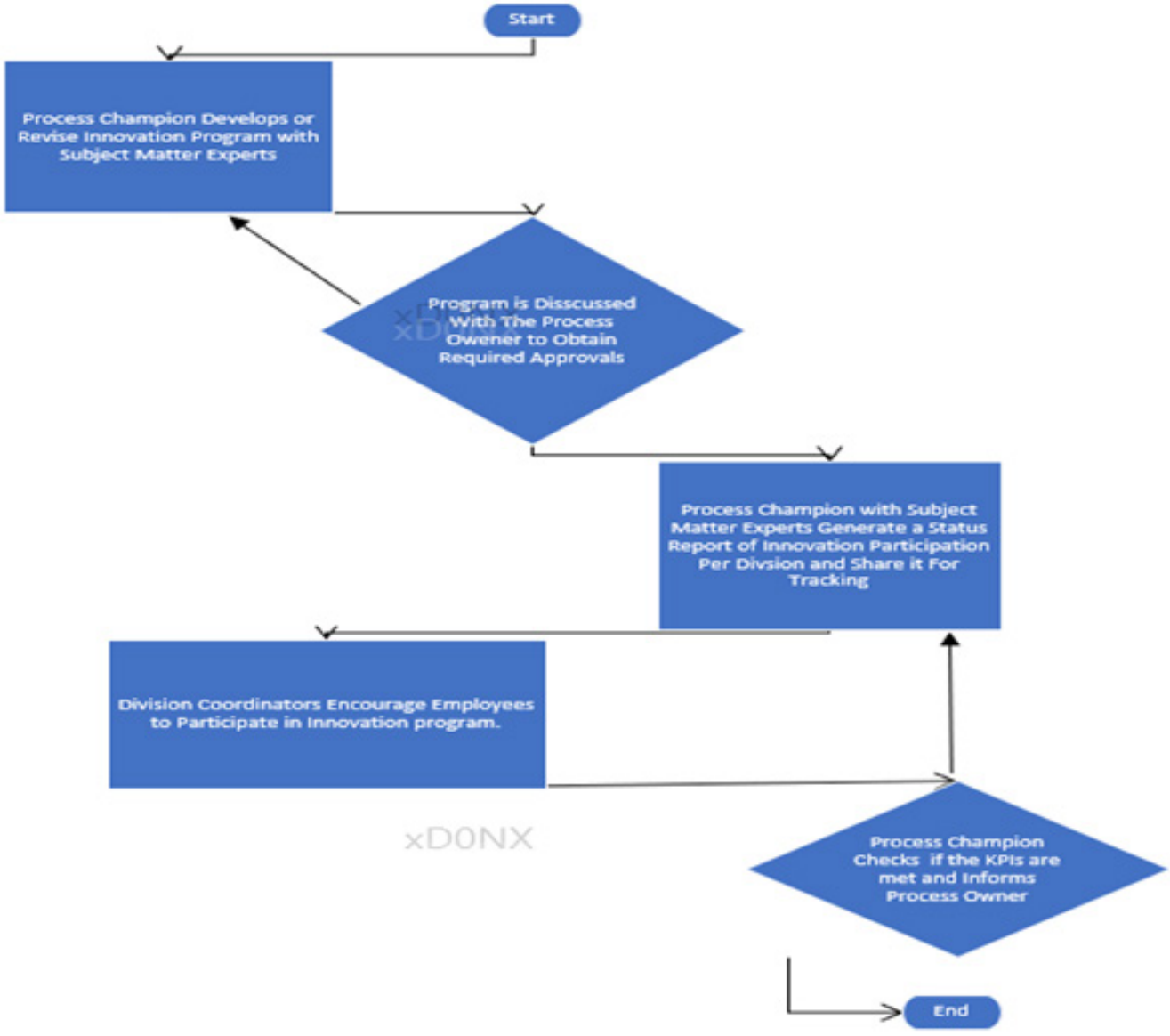

Figure 2 Process Flow of Manual Innovation Submission Rate Tracking.

Additionally, the innovation process involves a structured approach to reviewing, approving and implementing submitted ideas, as well as tracking their realized value, as illustrated in Figure 3. This figure outlines the remaining key stages involved in executing and tracking the innovation process, from review and approval to implementation and capturing of realized values. A key component of this process is the monthly meeting between the process Champion, SMEs, and Division Coordinators to review and evaluate submitted ideas against established selection criteria. Ideas that meet the criteria are nominated for approval and implementation, and subsequently proposed to the Process Owner for final approval. Upon approval, SMEs, collaborate with Idea Owners to develop a comprehensive execution plan. Once the plan is finalized, SMEs, conduct regular progress checks with Idea Owners to ensure successful implementation. After Implementation, SMEs work with Idea Owner to capture the benefits of the idea in a “Realized Value Form”, which is then uploaded to the innovation portal for record-keeping purposes. To track progress and measure success, the Process Champion and SMEs generate KPI reports on idea review, approval, implementation and realized value. These reports are shared with the divisions to monitor progress against established targets. This iterative process is repeated until targets are met.

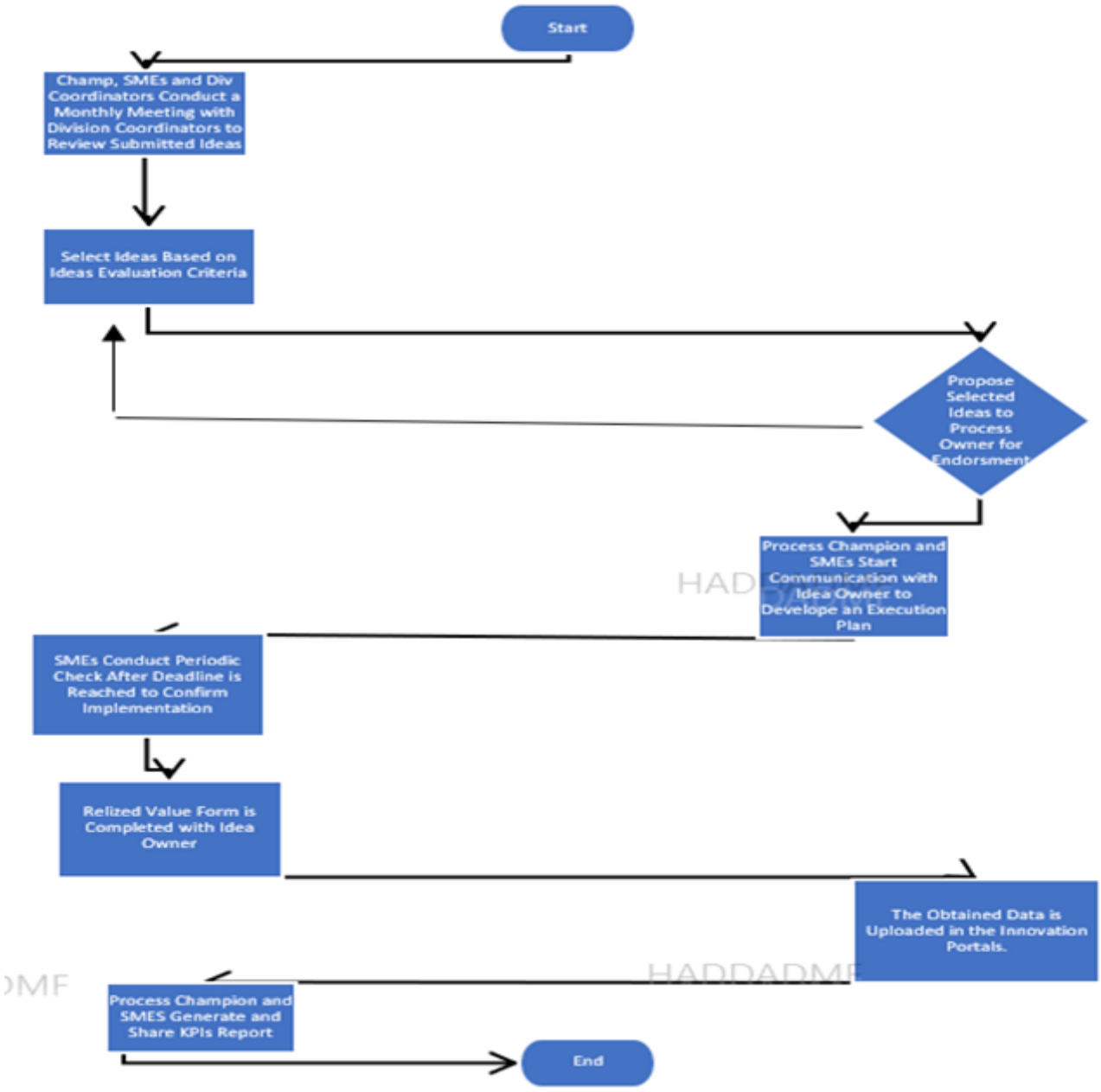

Figure 2 Process Flow of Manual Innovation Submission Rate Tracking.

As illustrated in Figure 2 and Figure 3 innovation manual structured approach highlights the potential for automation to streamline repetitive tasks, reduce manual efforts, and enhance scalability across similar processes. By addressing the inefficiencies in innovation 12.1 manual implementation, the proposal aims to establish a replicable framework for future implementation of other processes associated with operational excellence.

As depicted in Figure 4, the implementation of operational process 12.1 innovation can be significantly enhanced through automation. This paragraph will delve into the benefits of combining Artificial Intelligence (AI) with automation, specifically in reducing the workload on employees for repetitive tasks and promoting focus on strategic planning and decision-making. The automated implementation of this process begins with AI generating an innovation program outline, which highlights the main requirements based on the Operational Excellence manual. This outline is then routed to the Process Champion through a workflow (WF) for finalization. Upon completion, the Process Champion submits the program to the system, triggering an automatic WF to the Process Owner for approval.

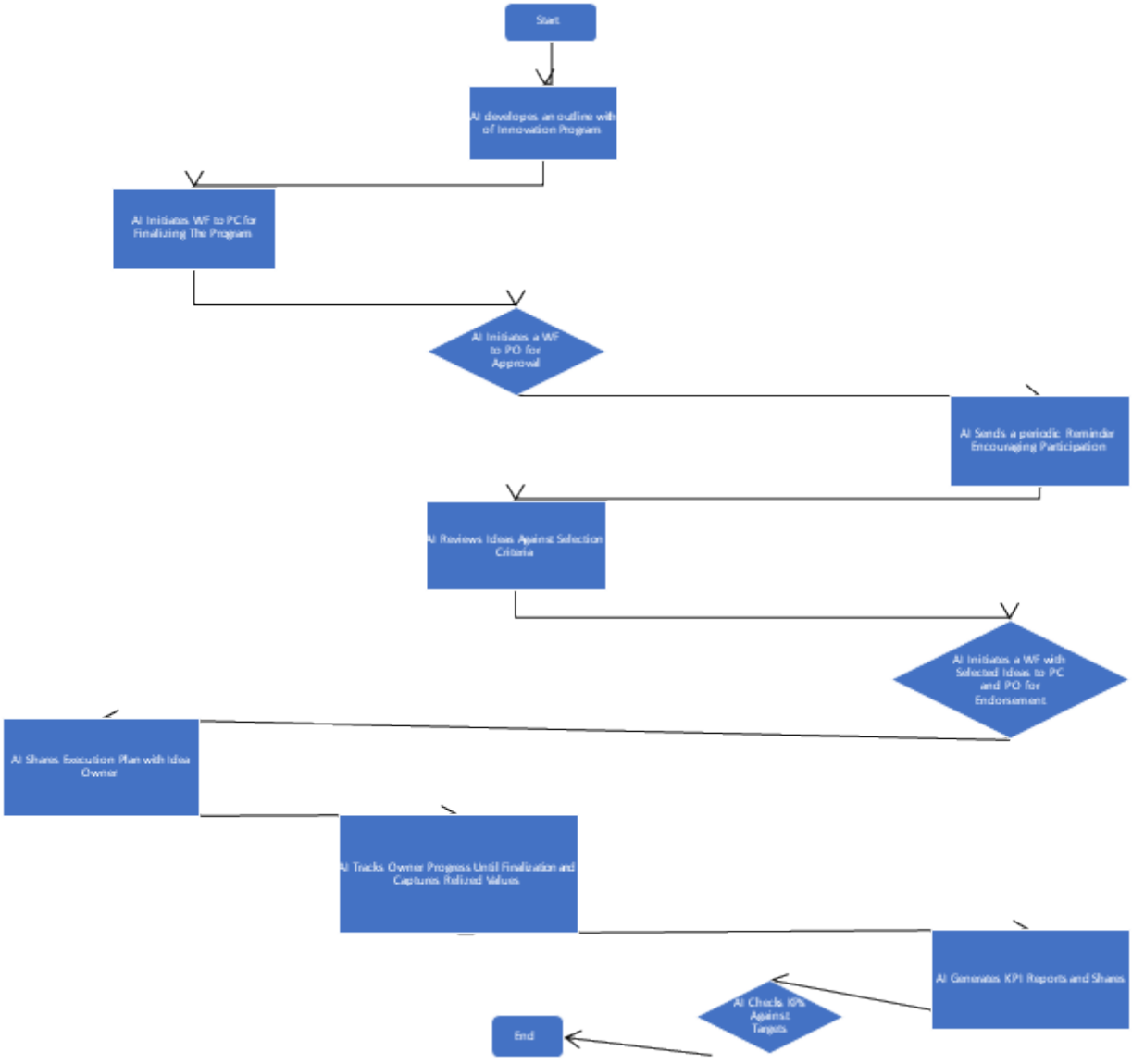

Figure 4 Process Flow for Automated Innovation Process Implementation

Upon approval of the innovation program, the advantages of automation over manual process become increasingly evident. To facilitate employee, engagement, the AI system initiates a periodic reminder campaign, encouraging all staff members to participate in the program. Each reminder includes a unique message emphasizing the significance of innovation and its potential to drive business improvement within the department. Following the submission of ideas, the AI conducts a thorough review against the program's established selection criteria. The system then nominates the most suitable idea for endorsement by the Process Champion. Upon receiving the champion's endorsement, a workflow is triggered, routing the selected ideas to the Process Owner for final approval and implementation.

Following approval for implementation, the AI system initiates communication with the idea owner to propose a preliminary outline for the execution plan. The Idea Owner is then responsible for completing and refining the plan, which is subsequently resubmitted into the system. As the volume of approved ideas for implementation increases, the manual aspects of this process become increasingly resource-intensive. In contrast, the proposed automated AI system is capable of efficiently handling the communication with the Idea Owners, even as the number of implemented ideas grows significantly. This scalability enables the organization to manage a large volume of ideas without a corresponding increase in manual effort, thereby optimizing the implementation process.

The automated AI system then captures the benefits of executed ideas through a workflow sent to the Idea Owner, requesting feedback on the outcomes of the implemented ideas. This information is used to generate key performance indicators (KPIs) that track the effectiveness of the innovation program, including metrics on idea submission, review rate, idea selection, implementation, and realized benefits. These KPIs are compiled into reports that are shared with the relevant divisions for record-keeping and analysis. If the KPIs indicate that the program is not meeting its targets, the automated AI system will reinitiate the process, triggering a new cycle of idea submission, review and implementation.

Finally, to conclude this section, a comparison between the manual implementation of Operational Excellence 12.1 and the automated implementation has been included in Figure 5.

Criteria	Manual 12.1	Automated 12.1
Efforts Required	High manual workload and intensive coordination.	Minimal manual effort and automated routing, coordination and documentation
Scalability	Limited; effort increases linearly with volume	High; AI handles increased volume efficiently
Speed	Slower due to sequential human interactions	Accelerated via parallel AI-driven workflows
Accuracy	Prone to human error in data entry and tracking	AI ensures consistency and minimizes errors
Employee Engagement	Manual reminders and encouragement required	AI-driven campaigns with personalized messaging
Decision-Making	Slower due to manual data analysis	Real-time analytics and AI assisted recommendations.
KPI Tracking	Manual Generation of KPI reports, prone to delays and errors	Automated tracking and real-time reporting
Continuous Improvement	Limited feedback loop	AI enables ongoing optimization and process refinement
Innovation Capacity	Limited capacity for innovation due to manual constraints	Increased capacity for innovation through automated process and scalability

Figure 4 Process Flow for Automated Innovation Process Implementation

IV. CONCLUSION

Having demonstrated the advantages of automated AI implementation for innovation process 12.1, it is evident that this approach can have profound impact on operation efficiency and employee's productivity. By automating manual tasks, such as report generation, repetitive communication, and form filling, employees are freed from time-consuming activities, enabling them to focus on higher-value tasks that drive business growth. The potential benefits of scaling up this proposal to cover all Operational Excellence processes, as well as similar tasks in other company business areas that are similar in nature are substantial.

Furthermore, the automated AI process can be utilized to promote self-auditing and ensure compliance with company standards and procedures. By identifying and addressing non-conformance items that occur due to human error, organizations can mitigate risks and improve overall work quality. By embracing automated AI process, organizations can unlock new levels of efficiency, productivity and innovation, ultimately leading to improved competitiveness and growth

V. ACKNOWLEDGEMENT

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