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Agile Development of Workflow Automation using Microsoft Powerapps

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Abstract: *Low-code platforms are widely used for the quick development and deployment of applications based on varying needs. This project explores the usage of the Microsoft power application along with the SharePoint portal for automation of workflows in a conventional organization on agile mode. Use-case and user stories were developed to understand the requirement, workflows were defined in an agile manner and the application was developed using Microsoft power application and SharePoint. Key benefits being automated workflows, data logging, data management, tracking, Management Information System (MIS) report generation with automated alerts*

Keywords: SharePoint, PowerApps, Power Automate, workflow, usecase, user stories, management information system, data management, automated alerts

I. INTRODUCTION

Low code or No code software development platforms are available for various application development ranging from mobile to desktop (cross-platform development) and can be done with ease because they mostly run-on browser. Coupled with the fact that it mostly involves the drag and drop of application component in a development playground. They can be used for rapid development of application by a tech-savy user like business analysts, administrators, and small business owners as this require almost little or no coding experience. This is enabled by the low-code platforms though GUI (Graphical User Interface) and well-documented information about the operations, functionand working. Also, the presence of a support community constituting the platform user makes it easy to learn and develop software at their own pace.

The growth of these low-code platforms has increased over time due to many reasons. Some of them include:

Rapidly changing requirements that need to be met in a highly time-constrained environment.

The lack of skilled software developers

Requirement for the company based and functionality-based tailor-made application

Low maintenance cost

Microsoft PowerApps is one of the leading low-code platforms providing AaaS(Application as a Service) mostly available with the O365 (Office 365) - a Microsoft product which is available for sale and bought by many companies for their services like

- E-mail services
- Office apps
- OneDrive & SharePoint

Powerapp was introduced in November 2015 and a public preview was announced in April 2016, the first stable version open to business was released in October 2016. PowerApps applications are no different than other normally developed software, it also has two parts – Backend and Frontend.

The frontend part is covered by the PowerApps and the Backend can be selected from a wide range of connectors which includes other Microsoft applications like SharePoint, Microsoft Dataverse, Excel Sheet Cloud Storage, or even RDBMS like, Microsoft SQL Server, Oracle Db to name a few.Out of these SharePoint, Excel and Dataverse are the most popular options.

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SharePoint is also part of the O365 package which is a PaaS(Platform as a Service) that is used to create websites and storing, sharing, organizing of data for complete organization securely. SharePoint can be used to create many sites for the organization. The general implementation in an organization is that there will be a main site maintained by the IT admin of the organization and the user of the SharePoint can create their own websites and invite their own team members and share data exclusively with in the team.

SharePoint can be used to create various forms of data ranging from list and library private page to our own PowerApps associated with the team. Microsoft provides an inbuiltsupport for monitoring the sites and managing them.

There are some storage limitations associated with SharePoint when it comes to sharing data.The total storage that can be associated with a particular site cannot be more than 100GB and each file must be less than 15GB.Also, the number files that can be present in the SharePoint cannot be more than 30,000 at this point in time. Thismakes it not suitable for organization that requires large files that needs to transferred between the organization like in case of 3-D rendering or 3-D models of products or 3-D photos and videos which will easily cross the limit of storage provided.

This can be integrated with PowerApps with the help of 'Lists' which is an inbuilt feature in SharePoint and these lists can be connected from PowerApps very easily.

Along with SharePoint, PowerApps can also be integrated with Power Automate which can be used to perform various tasks on the backend of the application whose triggers may be automatic (based on time) or manually based on the user interaction with the Powerapp.

Power Automate are relatively easy to create and maintain but serves to be very useful in environment where there is a large flow of data, many targets and deadlines that need to be monitored. These Power Automate flows can be created either from scratch or there are pre-existing templates provided by Microsoft itself. Also, the community for Power Automate, PowerApps and SharePoint is well maintained andalso huge thus providing a high learning curve.

Every application will be following an Application Development Cycle (ADC). The steps involved in ADC are:

1. Obtaining the concept based on the requirement of the customer or application users in the form of use case / user stories.
2. Prototyping a sample application based on the requirement.
3. Development of the application
4. Testing of the application
5. Deployment of the application
6. Release to the user.

This takes place in the form cycle till all the requirements are satisfied. The features that are developed at the start of the development process will thus have undergone rigorous testing ultimately giving a highly stable software.

Unlike a normal application, the stability of the PowerApps not only depends upon the application developers and their understanding of the requirement but also on the stability of the platform.

II. REVIEW OF LITERATURE

Literature review were conducted to understand the present research gaps and are as below:

Samar Al-Saqqa et al. (2020) talks about software engineering as a discipline that aims to develop new advancements in technologies and keep up with the modern business requirements through software products. Agile software development is a lightweight approach that was proposed to overcome the convolutional development methodology. This is done by managing the tasks and their coordination through a certain set of values and principles.

Marco Kuhrmannet al. (2021)investigates on what makes the software development in industry agile. An empirical study grounded in a large-scale international survey that aims to identify software development methods and practices that improve or tame agility was presented.

Henry Edison et al. (2022) talks about the various types of agile methodology followed in large scale industry like SAFe (Scaled Agile Framework), LeSS (Large Scale Scrum), Scrum-at-Scale, DAD (Disciplined Agile Delivery) and the Spotify Model and all of them are compared based on practices, tools and metrics in a standardized manner. Based on those analysis, a company can choose their own method for incorporating Agile in Software Development.

Rashina Hoda et al. (2018) embarks on a journey starting from the 70s and 80s method of software development, their policies, advantages and disadvantages and how the formulation of Agile methodology for software development took

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the software industry by a whirl, its advantages, disadvantages and why company follows agile methodology in spite of their disadvantage.

Malek Al-Zewairi et al. (2017) analyses why Agile software design and development process have been receiving rigorous attention in software engineering research community and covers all the development methods used between January 2000 and December 2015 using Compare and Review Method

Alina Mihaela Dima et al. (2018) talks about the migration from the Legacy Software Development model like Waterfall Model to Agile Methodology which helps in implementation of rapidly changing and increasing requirements with Agile Methodology. This revels the fact that technology changes, software development model evolve.

Raquel Sanchis et al. (2019) explains that the enterprises needs to make quick and resilient response to the ever changing requirements andachieving this with the help of traditional software development method will be efficient in a long run but it doesn't provide immediate response to even tackle the problem momentarily. Thus, it explains about the need, advantage and disadvantage of various low code platform for software development.

YH Chang et al. (2017) explains the increase in the need of mobile application within the enterprise which cannot be met by the traditional IT system. He talks about platform where non-developers can who are in-charge of business can develop application for their work quickly with more stability.

Jari Porras (2018) conducted a case study on a Finnish Company Biit Oy to find out what is low code platforms, advantage of standard software method, what do they offer and how can they be used in an organization.

D Krejci et al. (2021) tries to find methodology to improve the efficiency of converting the UI/UX designed in UI tools to low code platform. While most of the UI tools like Figma generate code for standard software development methodology, they don't for Low code platform. They are done manually resulting in 100% rework. With that implementation, there was about 1.5 to 4 times increase in the number of pages or screen that can be delivered with the same effort.

Ajay Rajaram et al. (2022) talks about the various video conferencing tools used during the Covid-19 pandemic and the lack of a single tool to access all the resource at a single point and also customized application with low code approach andhow the integration Microsoft PowerApps and Teams can solve the problem.

Based on the above literature reviews, the following significant findings/gaps are observed:

- Agile modules are more widely used for software development projects
- The underlying principles of agile development method is to face uncertainty better
- SCRUM is the main subset of Agile
- Well-defined goals, themes and metrics for the development process
- Incremental delivery of software, team collaboration, continuous planning and learning emphasized

III. BANK GUARANTEE & ITS LIFE CYCLE

Bank Guarantee (BG) is a financial backstop offered by lending institution for acquiring goods, buying equipment or draw a loan. The general workflow for a BG is as follows. Let us consider a case of two companies and let them be Company A & Company B and there exists a Bank Z. Here let us assume that Company A wants to buy good from Company B.

- When Company A wants the good from Company B, it will request a BG from Company B for the advance amount that the Company A will be paying to Company B as a security or collateral.
- Company B will obtain a BG from Bank Z.
- Company B will inturn submit the BG to Company A and the amount of money that has been approved by the BG will be paid to the Company B.
- After completing the order or purchase & the entire goods had been transferred, the rest of the amount will be paid and also the BG will be returned.
- This can be then used by the Company B to retrieve back it collateral (if provided).
- If the Company B doesn't deliver the product within the expected date, then there can be an extension of the BG or the Company A can retrieve its advanced that it had paid from the Bank Z& the Bank Z will take ownership of the collateral.

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IV. AUTOMATION BG PROCESSING USING SOFTWARE

This application mainly focuses on automating the process of BG processing with respect to the company or the organization making the purchase. This application segregates the processing into two sides.

- Legal Side
- Purchasing Side

Workflow of BG within the organization:

- The BG will be submitted by the company to whom the purchase is made & this will be processed by the Purchaser department with respect to the product & its delivery.
- Then, this will be submitted to the Legal department of the organization which will verify the BG with respect to its value, its validity terms & conditions.
- If it passes the verification by the Legal Department, it will send back to the Purchaser department which then initiate the payment process. (payment process is not covered by the application). The application deals only with the receipts & memos that are generated during the process.
- If the product is delivered within the specified data, the BG will be returned by the Purchasing department with the concurrence of the Legal Department.
- Else if the product is not delivered within the before mentioned data, the Purchasing department can submit the BG to the bank & retrieve their advance.
- If the product is not delivered the company requests a extension, then an Extended BG will be created with new BG number along with the new BG pointing to the older BG.
- Extended BGs can be created for already extended BGs.
- Mail triggers are sent based on the remaining number days to expire as per below conditions:

  BG expiry less than 30 days, mail trigger to the employee who placed the order.
  Less than say 21 days, additional mail alert to the team leader
  Less than a week for expiry, mail alert to the Head of the Department until expiry (or) resolution.

V. DEVELOPMENT OF AGILE POWER APP FOR AUTOMATION WORKFLOW:

Agile is one of the software developments practices which helps in adapting to ever-changing requirements, especially in large and complex applications.

Agile is based on an iterative or interactive model and consists of the various method.

- SCRUM
- XP (Extreme Programming)
- AUP (Agile Unified Process)
- DSDM (Dynamic System Development Method)
- FDD (Feature Driven Development)
- AM (Agile Modeling)
- Crystal Clear

All these methods fall under the dynamic process model of software development.

Agile mainly focuses on

- Customer Satisfaction
- Rapid delivery of working software
- Process Adaptability

Agile provides:

- Individualism and Interaction over Processes and Tools
- Working software over Comprehensive Document
- Customer Collaboration over Contract Negotiation
- Responding to Changes over following a particular path

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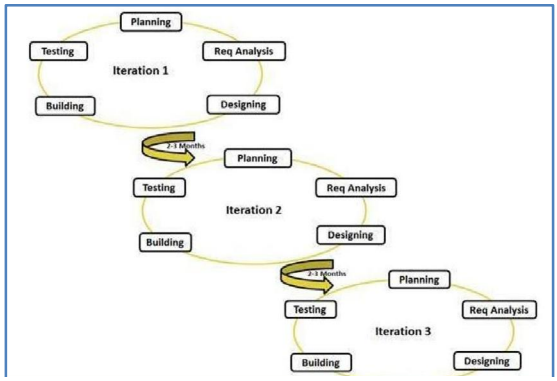
Ideal Agile Method will have daily interaction with Customer or Application User, helping in breaking down larger components into smaller parts which then can be solved individually and can be integrated with other smaller components ultimately satisfying the requirements.



Artifact 1.0: Life cycle of a product undergoing Agile (SCRUM) methodology

The most famous technique of the Agile Method is SCRUM

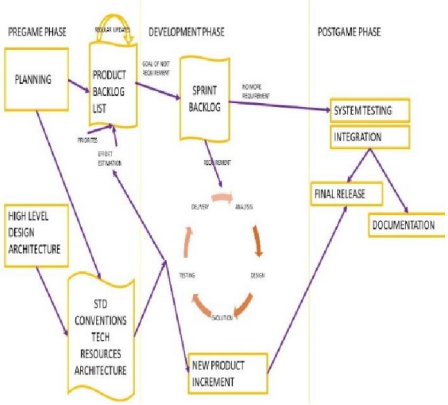
SCRUM:

This includes a

- Scrum Master (similar to Project Manager)
- Product Owner (similar to Customer)
- Agile Team (similar to Developer team)

The smaller components in the agile method are called sprints and there will be multiple sprints of same duration.

In the first sprint, there will be grooming which includes the estimation of required outcomes, Understanding the user stories, Refining the user stories and at last priorities the user stories.Then the development of the sprint takes place while will include the design, development and testing of the developed sprint which will be then delivered to the customer. The next sprint undergoes the same process and after development, this will be integrated with the first sprint. The sprint backlog contains the user story of the current sprint.After the development, there will be a sprint review where the review of the developed sprint will take place. After sprint review, Sprint Retrospective will take place which will analyze the existing problem in the developed sprint and the methods and solutions to overcome them. This increases the quality and effectiveness of the sprint.



Artifact 2.0: Describes the SCUM process

BENEFITS:

The usage of these Low/No-code platforms for software development includes the following advantages:

Improves workflows due to lack of errors and high efficiency and availability of the PowerApps platform

The ability to develop applications on our own reduces our reliance on software developers thus reducing cost.

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Every action performed in the Powerapp can be logged into the SharePoint system which helps in record keeping
Granular Enterprise Visibilityand Access Management which is provided by default by Microsoft
Since the development of these low code application requires less time to develop when compared to a classical application with the same functionalities it results in higher productivity.
Due to the absence of reliance on a software developer these platforms provide an effortless method to incorporate new changes that are required for the application thus providing a better user experience
Provide a medium for achieving effective risk management and governance platform since any changes to the application can be done swiftly, effectively and easily.
Reduce the product development complexity thus providing a faster transformation rate than ever.

VI. CONCLUSION

Thus we can conclude that Agile Methodology for Application development using low-code No code platforms presents the next generation software product development cycle a boost interms of reduced application development lead time and enhanced customer centricity in overcoming the rapidly changing requirements without compromise on the performance nor quality measures.

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