



Digital Transformation of SAP Supply Chain Processes

Build Mobile Apps Using SAP
BTP and SAP Mobile Services

—
Pranay Gupta

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Digital Transformation of SAP Supply Chain Processes: Build Mobile Apps Using SAP BTP and SAP Mobile Services

Pranay Gupta
Atlanta, GA, United States

ISBN-13 (pbk): 979-8-8688-0269-0
<https://doi.org/10.1007/979-8-8688-0270-6>

ISBN-13 (electronic): 979-8-8688-0270-6

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Cover designed by eStudioCalamar

Cover image designed by Freepik (www.freepik.com)

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In the pursuit of knowledge and the creation of this book, I am profoundly grateful for the unwavering support and love of two extraordinary individuals—my beloved wife Sugandh and our cherished son Iyvaan.

Sugandh, you have been the anchor in the storm of deadlines and challenges, a source of unwavering encouragement, and the silent force that kept me going. Your understanding, patience, and belief in my endeavors have been the cornerstone of this project. Your sacrifices and tireless support are the foundation upon which this book stands.

To my dear Iyvaan, your infectious laughter, boundless energy, and innocent curiosity have been a constant reminder of the importance of the work I do. Your presence has turned even the most demanding moments into opportunities for growth and inspiration. This book is a tribute to the joy you bring into our lives and a promise to continue striving for a better future for you.

Together, you both have been my motivation, my solace, and my greatest cheerleaders. This book is not just a professional accomplishment; it is a shared victory made possible by the love and support that envelops our family.

With heartfelt gratitude and immense love,

Pranay

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About the Author



Pranay Gupta is a senior advisory consultant at IBM with over 18 years of dedicated experience in the ever-evolving realm of technology and enterprise solutions. He is a certified project management professional (PMP). His proficiency in SAP is further underscored by a series of certifications, including SAP S/4HANA Sourcing and Procurement, S/4HANA EWM (Extended Warehouse Management), ARIBA Buying and Invoicing, and SAP SRM (Supplier Relationship Management). His passion for innovation has led him to explore the synergies between mobility and SAP, enhancing the efficiency and accessibility of enterprise processes. He has been instrumental in providing strategic guidance and solutions to a diverse set of industries, including oil and gas, manufacturing, telecom, travel, and transportation. This wide-ranging exposure has allowed him to understand and address the unique needs and intricacies of each sector, contributing to their growth and digital transformation of ERP processes. He has a keen interest in exploring cloud technologies and he is an Amazon Certified AWS Cloud Professional and a Microsoft Certified Azure Cloud Professional.

About the Technical Reviewer



With 15 years of IT experience in ERP solutions, **Sugandh Gupta** is a seasoned Salesforce consultant. Her expertise encompasses a wide range of areas within Salesforce, including implementation, customization, and optimization, and she has demonstrated her skills in utilizing various APIs to enhance and streamline Salesforce

implementations, ensuring smooth connectivity with external systems and data sources. Sugandh's technical proficiency extends beyond standard Salesforce configurations, showcasing a deep understanding of API-based solutions.

Introduction

This book offers a paradigm shift in the execution of SAP transactions, as it explores the use of iOS apps rather than traditional desktop interfaces or SAP's native Fiori apps. Specifically designed for scenarios where clients seek alternatives to SAP's Fiori apps for SAP supply chain or other modules, this book provides a roadmap for modernizing and streamlining supply chain operations through the innovative utilization of Angular iOS apps.

Key highlights include understanding the intricacies of integrating SAP's backend (SAP ECC) with Angular iOS apps using SAP Mobile Services on SAP BTP. Readers will gain insights into high-level SAP supply chain processes, the process of linking Zebra printers to iOS for SAP PDF label printing, and fundamental procedures for setting up authorization endpoints, token endpoints, virus scanning, and base URLs within SAP Mobile Services.

The book explores essential knowledge on managing attachments in mobile applications and storing them in an external content repository by leveraging SAP Document Management System (DMS) configurations. The book also guides readers in acquiring proficiency in testing OData services using the POSTMAN API client with the OAuth protocol. It also helps readers understand JSON messages, the CORS protocol, and X-CSRF tokens in data exchange.

This book is not just a manual; it is a compass for businesses aiming to remain competitive in today's technology-driven landscape. Readers will gain the expertise needed to navigate the evolving landscape of SAP integrations, enhance supply chain processes, and embrace the future of digital transformation.

CHAPTER 1

Growing Need of Mobility Apps for ERP Solutions

In the modern business landscape, where agility, accessibility, and real-time decision-making are paramount, integrating mobile applications into SAP (Systems, Applications, and Products) ERP (Enterprise Resource Planning) solutions has emerged as an imperative. This transformational shift signifies a pivotal moment in how organizations leverage technology to optimize operations, engage users, and drive a competitive advantage.

The Evolution of SAP Mobility

The journey toward SAP Mobility has been a progressive one, reflecting the evolving needs of businesses. Traditionally, ERP systems were confined to desktop environments, limiting accessibility and flexibility. However, the advent of smartphones and tablets ushered in a new era, empowering users to interact with ERP systems from virtually anywhere.

This evolution has led to the recognition of the critical role that mobile applications play in augmenting SAP ERP solutions. These applications serve as a bridge between traditional ERP systems and the dynamic,

on-the-go nature of today's workforce. They empower users to perform tasks, access information, and make informed decisions in real-time, regardless of their physical location.

Benefits of Mobile Applications for SAP ERP

Mobile applications in SAP ERP solutions are driven by a multitude of benefits:

1. **Enhanced accessibility:** Mobile applications offer a transformative advantage in terms of enhanced accessibility. They break down the traditional barriers of location and time, allowing users to access critical ERP data and functionalities from virtually anywhere, at any time. This accessibility is particularly valuable to field service personnel, sales teams, executives, and any employees who require instant access to crucial business information. Mobile apps empower users to perform tasks, make decisions, and collaborate with colleagues while on the go. Whether it's checking inventory levels, processing purchase orders, or reviewing sales figures, the ability to access ERP data remotely fosters agility and responsiveness within the organization. It ensures that employees are not tied to their desks and can remain productive even when they are outside the office. As a result, businesses can streamline their operations, reduce delays, and make informed decisions without the constraints of physical location. Furthermore, enhanced accessibility extends beyond the corporate office, enabling companies to connect with global

partners, suppliers, and customers seamlessly. This capability not only enhances internal workflows but also strengthens external relationships, driving efficiency and customer satisfaction.

- 2. Improved productivity:** Mobile applications are powerful tools for boosting productivity within an organization. These apps streamline processes, reduce the need for manual data entry, and provide intuitive interfaces that simplify complex tasks. As a result, users can perform their roles more efficiently, leading to faster decision-making and a reduction in operational bottlenecks. With mobile apps, employees can access and update critical data in real-time, eliminating the delays associated with manual data synchronization. This real-time access ensures that everyone is working with the most current information, reducing the risk of errors and improving data accuracy. The intuitive interfaces of mobile apps minimize the learning curve for new users and enhance user adoption. Employees can quickly become proficient in using the apps, allowing them to focus on their core responsibilities rather than wrestling with complicated software. In addition, mobile apps often come with features that automate routine tasks, such as data capture through the device's camera or barcode scanning. These features reduce the time and effort required for data entry and minimize the chances of data entry errors. As a result, employees can accomplish more in less time, leading to increased overall productivity.

3. **Real-time insights:** Mobile applications provide stakeholders with a valuable benefit—real-time insights into business operations. These apps enable users to receive instant updates on key metrics, such as inventory levels, sales figures, production status, and financial data. This timely access to critical information empowers decision-makers to make data-driven decisions promptly and effectively. Real-time insights are particularly vital in a fast-paced business environment where market conditions, customer preferences, and competitive landscapes can change rapidly. With mobile apps, executives, managers, and employees can stay informed about changes as they occur, allowing them to adapt strategies and tactics accordingly. For example, a sales manager can monitor daily sales performance through a mobile app, identifying trends and responding to fluctuations in demand. Similarly, a production manager can track machine uptime and production rates in real-time, making immediate adjustments to optimize output. Real-time insights facilitate proactive problem-solving and enable organizations to seize opportunities as they arise. Whether it's responding to a sudden surge in customer orders or addressing supply chain disruptions, mobile apps equip businesses with the agility needed to stay competitive in dynamic markets.

- 4. User engagement:** Mobile applications are designed with user engagement in mind, making ERP systems more approachable and user-friendly. This enhanced user engagement is a significant benefit, as engaged users are more likely to embrace technology and maximize its potential. The user-centric design of mobile ERP apps focuses on delivering an intuitive and visually appealing user interface. This design approach simplifies complex ERP processes, making them more accessible to a broader range of employees. Users can quickly navigate the app, access relevant information, and perform tasks without requiring extensive training or technical expertise. Engaged users tend to be more proactive and self-reliant, reducing the burden on IT support teams. They are more likely to explore the app's features, discover new ways to optimize their workflows, and suggest improvements or enhancements. Furthermore, mobile ERP apps often offer features that enhance collaboration and communication. Employees can easily share information, exchange messages, and collaborate on projects directly through the app. This fosters a sense of community and teamwork, driving higher levels of engagement and job satisfaction among employees. Ultimately, user engagement leads to increased adoption of mobile ERP apps and a more productive workforce, contributing to the organization's overall success.

5. **Competitive advantage:** Mobile applications confer a distinct competitive advantage to organizations. By leveraging these apps, businesses can respond more rapidly to market changes, evolving customer demands, and emerging opportunities. This agility becomes a game-changer in today's fast-paced business environment, where the ability to adapt swiftly is a key determinant of success. Mobile apps enable organizations to stay ahead of the competition by facilitating quicker decision-making. With real-time access to critical data and insights, leaders can identify market trends, customer preferences, and competitive threats promptly. This early awareness allows businesses to adjust their strategies, refine their products or services, and seize new opportunities before competitors can react. Additionally, mobile apps enhance customer engagement and satisfaction. Sales and customer service teams can provide faster responses to customer inquiries, address issues promptly, and offer personalized experiences. This results in higher customer retention rates and increased loyalty, which can be a significant competitive advantage. The competitive edge gained through mobile apps extends to operational efficiency as well. Improved productivity, streamlined processes, and reduced errors contribute to cost savings and a more agile business model.

Need for Custom Apps and Associated Challenges

Customizing apps when a client is not satisfied with native Fiori apps provided by SAP can be a complex and strategic decision. Here are some details to consider:

1. **Understanding client needs:** The foundation of any successful custom app development effort in the realm of SAP Mobility is a deep understanding of the client's specific requirements and pain points. This initial step is akin to laying the groundwork for the entire project. It involves engaging in a comprehensive dialogue with the client to unearth their unique needs and challenges within their SAP environment. Start by listening attentively to your client's objectives and concerns. What are the precise features or functionalities that are currently missing in the native Fiori apps that they require? It's essential to drill down into the specifics to identify the pain points and bottlenecks that hinder their productivity. Perhaps they need enhanced reporting capabilities, real-time integration with external systems, or custom workflows tailored to their unique business processes. This phase of understanding the client's needs goes beyond surface-level inquiries. It necessitates collaboration with various stakeholders within the client's organization to capture a holistic view of their requirements. By doing this, you gain insights into not only what they need but also why they need

it. Understanding the “why” is pivotal to crafting solutions that are not just functional but also strategically aligned with the client’s overarching business objectives.

2. **Assessing the native Fiori apps:** Before embarking on the path of custom app development, a thorough assessment of the native Fiori apps provided by SAP that your client finds unsatisfactory is crucial. This assessment serves as the diagnostic phase of the project, where you pinpoint the specific areas of dissatisfaction and the reasons behind them. Begin by conducting a detailed evaluation of the native Fiori apps in question. Identify the aspects that are causing the client’s dissatisfaction. Is it due to a lack of customization options within these apps, or are there inherent limitations in the native apps themselves? Are there gaps in functionality, user experience, or integration that hinder the client’s ability to perform their tasks efficiently? This phase involves scrutinizing the native apps from various angles, including usability, functionality, performance, and scalability. By comprehensively assessing the native Fiori apps, you gain a clearer picture of the challenges that need to be addressed. It also helps in determining whether customization, enhancement, or the development of entirely new custom apps is the most appropriate path forward.
3. **Choosing customization vs. development:** The decision to pursue customization of existing Fiori apps or embark on the development of entirely new custom apps is a pivotal one in the project’s

lifecycle. It hinges on the extent of the required changes and the alignment with the client's goals. Customization often proves to be a more cost-effective and time-efficient approach when the required modifications are relatively minor. It involves tailoring existing Fiori apps to better align with the client's needs. Customization can encompass changes to user interfaces, data presentation, workflows, and even the addition of new features within the framework of the native apps. Conversely, in cases where the client's needs demand substantial alterations or entirely new functionalities that are not feasible within the confines of the native apps, custom app development becomes a necessity. This path offers the flexibility to build apps from the ground up, ensuring that they are precisely aligned with the client's requirements. The decision between customization and development should be based on a cost-benefit analysis, considering factors such as project timelines, budget constraints, and the long-term scalability of the solution. It's a strategic choice that sets the project's direction and shapes the ultimate deliverables.

- 4. Exploring SAP Fiori extensibility options:** SAP Fiori offers a range of extensibility options, including the SAP Fiori Elements framework, which simplifies the customization of existing apps. These options provide a middle ground between full custom development and native app usage, and they should be explored thoroughly during the

project's planning phase. The SAP Fiori Elements framework, for instance, enables developers to enhance existing apps by adding custom fields, modifying layouts, and extending the application's functionality. This approach leverages the native app's foundation while tailoring it to the client's specific needs. It's a particularly attractive option when the required changes can be achieved without significant development efforts. Exploring SAP Fiori's extensibility options should be an integral part of the project's strategy, as these options can potentially provide solutions that address the client's requirements without the need for extensive custom development. This approach often offers the benefits of faster implementation and ongoing compatibility with SAP updates.

5. **Considering user experience design:** Whether you opt for customization or custom app development, user experience design should be a central focus. Custom apps need to provide an intuitive and efficient user interface that aligns seamlessly with the client's brand and workflow. Effective user experience design begins by understanding how users interact with the app and the workflows they engage in. This insight informs the creation of user interfaces that prioritize ease of use, minimize cognitive load, and enhance user productivity. User-centric design principles guide the development of custom apps, ensuring that they are not just functional but also a pleasure to use. Elements such as navigation menus, data

presentation, input forms, and interactive elements should be designed with the end user in mind.

Considering accessibility and responsive design is also crucial to accommodate diverse user needs and devices. A well-designed user interface fosters user adoption, reduces training overhead, and enhances overall satisfaction with the app. It also contributes to the app's long-term success, as users are more likely to engage with and rely on an app that is user-friendly.

6. **Integrating with SAP Systems:** In the context of SAP Mobility, custom apps, if developed, must seamlessly integrate with the client's existing SAP landscape. This integration encompasses multiple dimensions, including compatibility with SAP modules, data sources, and adherence to SAP's security protocols. Integration with SAP modules ensures that the custom app can access and manipulate relevant data and functionalities within the SAP ecosystem. This may involve connecting with SAP's various modules, such as SAP S/4HANA, SAP ECC, or SAP Business Suite, depending on the client's configuration. Data integration is another critical aspect. Custom apps need to pull and push data to and from SAP systems in real-time or near-real-time to ensure data accuracy and consistency. Integration mechanisms may include APIs, web services, or middleware solutions to facilitate data flow. Security is paramount in SAP environments, and custom apps must adhere to SAP's security protocols and standards. This includes user

authentication, authorization, encryption, and compliance with data privacy regulations. Ensuring the security of sensitive data within the app is essential to prevent data breaches or compliance violations.

7. **Handling data management and security:**

Data management and security are paramount considerations when developing custom apps for SAP Mobility. Addressing these concerns ensures the confidentiality, integrity, and availability of sensitive data while maintaining compliance with data privacy regulations. Custom apps must be designed to handle data securely, whether it's financial records, customer information, or proprietary business data. Robust data encryption mechanisms should be in place to protect data during transmission and storage. Role-based access control should be implemented to restrict data access to authorized users only, aligning with SAP's security protocols. Compliance with data privacy regulations, such as GDPR (General Data Protection Regulation) or HIPAA (Health Insurance Portability and Accountability Act), is critical. The custom app should be configured to manage personal data in compliance with the relevant regulations, including data consent management and the ability to fulfill data subject access requests. Addressing data management and security concerns not only safeguards sensitive information but also fosters trust among users and ensures legal compliance.

8. **Ensuring scalability and performance:** The need for custom apps in SAP Mobility extends to ensuring scalability and performance. Organizations often grow and evolve, and custom apps should be designed to accommodate these changes. Scalability refers to the app's ability to handle growing user loads and data volumes without a significant drop in performance. Scalability planning begins by considering the expected user base and data growth over time. Custom apps should be architected in a way that allows them to scale horizontally or vertically as needed. This could involve deploying additional server resources, optimizing database structures, or implementing caching mechanisms to enhance performance. Performance optimization is equally important. Custom apps should remain responsive, even under heavy use. This involves optimizing database queries, minimizing network latency, and fine-tuning code to ensure swift execution. Load testing and performance profiling are essential steps to identify and rectify potential bottlenecks before they impact users. Scalability and performance considerations are future-proofing measures that help ensure the long-term viability of custom apps as an organization's needs evolve.
9. **Testing and quality assurance:** Implementing a rigorous testing and quality assurance (QA) process is a non-negotiable aspect of custom app development for SAP Mobility. Thorough testing aims to identify and rectify any issues, bugs, or usability problems before deploying the app to

users. The testing phase encompasses various dimensions, including functional testing to ensure that all features work as intended, usability testing to evaluate the user experience, compatibility testing across different devices and browsers, and security testing to identify vulnerabilities. Load testing and performance testing are crucial for assessing how the app performs under various conditions, including heavy user loads. This type of testing helps uncover scalability and performance issues that may need to be addressed. A well-executed QA process ensures that the custom app meets the defined requirements and aligns with user expectations. It minimizes the risk of post-launch disruptions and enhances the overall quality of the solution.

10. **Providing documentation and training:** Providing comprehensive documentation and conducting training sessions are essential for ensuring a smooth transition to custom apps in SAP Mobility. Documentation should include user guides, admin manuals, and technical documentation for developers. User guides help end users understand how to navigate and use the app effectively. Admin manuals assist administrators in managing and maintaining the app, including user access and data management. Training sessions are critical for both end users and administrators. End users should receive training on how to use the app, its features, and any new workflows it introduces. Administrators need training on managing user

accounts, handling data, and troubleshooting common issues. Effective documentation and training contribute to user adoption and minimize disruptions during the transition to custom apps.

11. **Providing support and maintenance:** Establishing a support and maintenance plan is essential for addressing any issues, updates, or enhancements that may arise after deploying custom apps. A robust support mechanism ensures that the app remains operational and responsive to changing needs. Support should include a helpdesk or support team that can address user queries and technical issues promptly. A ticketing system can help track and prioritize support requests, ensuring efficient problem resolution. Maintenance involves applying updates, patches, and enhancements to the app. Regular maintenance ensures that the app remains compatible with evolving SAP systems and operating environments. It also provides an opportunity to address any identified issues or improve the app's performance. The goal of support and maintenance is to provide a reliable and responsive experience for app users and administrators, contributing to long-term satisfaction and effectiveness.
12. **Establishing the budget and timeline:** Clear definition of the project budget and timeline is crucial for managing expectations and ensuring the project's success. Customization or development of apps can be time-consuming and may require a substantial investment, so it's important to have a well-defined