

Digital Transformation for Field Service Management - Application to Medical Equipment Delivery and Service

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Abstract— Field Service Management is the process of managing organization's on-field workers, equipment, service, and operations. It includes processes like scheduling and assigning work orders, dispatching workers to new assignments, communicating with field workers on the job, managing product inventory, and collecting data from the field. This Paper presents the scope for digital transformation of Field Service Management operations and the advantages of the same by providing example of Field Service Management operations in the Medical Equipment Delivery and Service Industry.

Keywords — *Field Service Management, SMAC, Digital Transformation, Digital*

I. Introduction

Field service management is the process of dispatching a team or a person of high skill for installation, maintenance or repair of equipment, systems, software, or any other assets. As field service technicians work on the assigned task, the field service manager(s) will be responsible for proper task completion.[1]

In general, Field service management includes the below components:

Work order management: Work orders are primarily of 2 types – Delivery work order and Service Work Order. This is the process of tracking and assigning work orders from creation to fulfillment and finally invoicing.

Field service scheduling: This is the process of managing schedules of field service technicians and service appointments to minimize work order completion timelines.

Field service dispatch management: This is the process of coordinating the movement of field service technicians along the entire route from starting location to the end destination.

Field service contract management: This is the process of ensuring service level agreements (SLAs) and any other contractual obligations are being met.

Inventory management: This is the process of keeping track of all parts, supplies, and assets throughout the general lifecycle.

II. Applying Digital Transformation to Field Service Management

Creating a Digital Platform: Service delivery experience for Customers begins with the knowledge of where to look for when a problem occurs and the confidence levels in the company to resolve a problem. To gain that confidence, field service organizations must create a digital platform where customers can register their problem. When customers know that their problems will be heard on a particular platform, they are confident of the company's ability to resolve their issues.[2][3]

Deploying a cloud-based Field Service Management Solution: Next is how effectively the team handles the Customer's issue. This requires the platform such as a field service management software to be easy to use, intuitive and the data should be easily transferred across the field locations. When that happens, employees don't have to struggle with the on-time availability of data, instead, it would empower them to tackle the challenges. In general, such solution comes with CRM capabilities to collect, process, and analyse customer data. Based on this data, the field service manager can schedule and dispatch the field service teams and track their activities in real-time, meanwhile, make informed decisions associated with route optimization, customer service, and cost.

IoT in Predictive Field Service: Predictive field service is the new trend. Data collected from IoT devices can be used to analyse patterns and trends, based on which, companies can create their service and delivery plan. In today's world, sensor networks and sensors have become highly advanced and with the utilization of cloud computing services, the data collection processes can be automated. This data can be integrated with the field service app after pre-

processing and cleaning, to reveal information about equipment's age, the voltage fluctuations, and customer usage patterns. Such information can be used to plan recruitment, inventory replenishment, and build pricing strategy.

Providing Mobile capabilities: Field Service technicians can be provided with a Mobile App where they can check their schedule and dispatch notes, make updates to orders while on field, view inventory online, get visibility into a customer's order history and more. Technicians are also better equipped to identify cross-sell and up-sell opportunities that can positively contribute to the bottom line.

III. Advantages OF DIGITAL Transformation of Field Service Management

Customers and businesses have been adopting new technologies. Social networks, Mobile computing, cloud computing, and IoT are technologies that are significantly changing customer behaviour. Companies need to revisit their field service process to ensure that they are capable of delivering excellent customer service at the lowest level of cost.

When everything goes digital, the speed of service delivery increases tremendously, as everyone in the chain is aware of their role and capabilities.

More accuracy in demand forecasting: Predicted demand, leveraging IoT and big data technologies, will allow organizations to collect real-time data and leverage advanced forecasting algorithms for the prediction of optimal window for service visits, instead of just relying on historical information.[4][5][6][7]

Predictive maintenance of Equipment: When remotely connected, IoT Equipment/Devices will stream real-time data that enables the organizations to predict and model potential issues. Preventative maintenance and servicing replace reactive service, hence reducing expensive interval-based service visits, travelling, wasted repeat visits and the risk of equipment/system downtime due to failure.

Scheduling Optimization: Optimization of scheduling, planning, and routing processes ensures that the right technician is being dispatched with the right parts and equipment to the right place at the right time. This increase in productivity enhances customer satisfaction (ensuring SLAs are met) while ensuring costly repeat visits are reduced.

Optimize internal process efficiencies: Real-time operational intelligence provides managers with insights into multiple aspects of the service operations while an end-to-end Field Service Management (FSM) solution automates the service supply chain. This removes paper processes and decreases the time from request to invoice, hence transforming service delivery from a reactive process to a proactive process.

Customer Engagement: Digitization of Field Service Management allow enterprises to connect and engage with customers like never. Using self-service portals in addition to personalized, real-time field service information like the details of technician's identity, ETA and visit duration, in addition to the ability to capture customer satisfaction information via surveys following a visit, Companies, can boost customer engagement and loyalty.

IV. Real Life Application to Medical Equipment Field Service Delivery

Background: The Company was a Medical Equipment manufacturer which provides Medical Devices to Hospitals and provides real time health monitoring Services to Patients. The Strategy of the Company was to become the most Patient Centric Company by providing excellent Patient care and Customer Service for the Hospitals.[8]

Challenges faced before digital transformation of Field Service:

- i. **Lack of Mobile capability:** There was no real time integration between the Order Management system and the delivery tools used by FSRs. The FSRs did not have the capability to update Work Order Status while they were on the field due to lack of Mobile capability of the Delivery management tool
- ii. **Lack of real time integration:** There was no integration between the Company's Order management system and the 3rd Party Contractors' tools. Everything was manually coordinated by the Customer Service Representatives of the Company with the 3rd party contractors. This resulted in delays in the delivery and Service of Critical Medical devices
- iii. **No Patient community portal:** The Real-time monitoring of Patient's vitals was recorded and transmitted from the monitoring device on the Patient to the

Monitoring system of the Company. The Patient should be billed only when they opt in for the service and vice versa. Due to the inefficiency in the system, there was a delay in transfer of Patient's opt in/out information to finance team which resulted in inaccurate billing

- iv. **Manual Processes:** The Delivery and Service of Medical Devices was handled by both the Company Field Service Representatives (FSRs) and 3rd party contractors. The Finance team had to do a lot of reverse transactions to correct the billing and refund the Patients manually.

Solution Implemented: A full-fledged Field Service implementation solution was proposed and implemented with the below functionalities:

- i. **Real time integration:** Provided Real time integration to the Order Management system of the Company
- ii. **Cloud Portal for Partners:** Provided 3rd Party Vendors with real time access to the Orders and Work Orders using Partner Community/ Portal
- iii. **Mobile capabilities:** Provided Mobile capabilities to the FSRs along with Reports and Dashboards for the Management
- iv. **Cloud Portals for Patients and Hospitals:** Provided Patient login (Customer Portal) where Patients could opt in/out for the Real time monitoring Services. This was integrated real-time to the financial system of the Company and hence solved the problem of inaccurate billing to patients. Provided Customer Portals for Hospitals

Results: Below were the results achieved and the corresponding metrics used to measure the same:

- i. The Delivery and Service of critical Medical Devices to Hospitals got optimized, hence reducing the delays, and resulting in on-time Patient care. The evidence for the result was the reduction in number of delivery and services related complaints/cases the company received YoY.
- ii. The Financial issues faced by Patients got reduced by improving the accuracy of billing for Real time monitoring Services for Patients. The evidence for the result was the reduction in the number of billing

related inquiries and complaints/cases from patients.

- iii. The overall Customer satisfaction improved and resulted in repeat business for the Company, hence making it the most preferred Company for Medical Equipment by both Hospitals and Patients. The evidence for the result was the increase in the number of Service renewal Contracts and decrease in number of Accounts lost.

V. Conclusions

Field Service Management is very often neglected in the overall Digital Transformation of Companies but plays a vital role in providing Customer with Products and Service on-time, hence improving the overall Customer Satisfaction. Digital Transformation of Field Service Management will result in optimization of end to end Field Service processes which ultimately results in improving the bottom line for Companies.

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